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THE SIGNIFICANCE OF THE PHYSICAL CONSTITUTION IN MENTAL DISEASE. By F. I. Wertheimer, Associate in Psychiatry, Henry Phipps Psychiatric Clinic, Johns Hopkins Hospital, and Florence E. Hesketh, Charlton Fellow in Medicine, Johns Hopkins University. Cloth. Price, $2.50. Pp. 76, with illustrations. Baltimore: Williams & Wilkins Company, 1926.

This volume is the tenth in the series of medicine monographs issued by the Williams and Wilkins press. In his preface Dr. Lewellys F. Barker welcomes the contribution as one of the first American essays on the importance of the human individual aside from his disease. The book provides an excellent review of various studies on the subject of body types in addition to furnishing a statement of original observations by the authors, including anthropologic measurements. The essay includes also a critique of Kretschmer's views and conclusions. Unfortunately, the authors propose their own nomenclature as a substitute for much of Kretschmer's. This is likely to complicate the field still further. Unquestionably, much medical research in the future will deal with the relationship of body structure to mental and physical disorders. This monograph will aid the general reader in securing the fundamental facts and theories thus far proposed.

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THE SIGNIFICANCE OF THE PHYSICAL CONSTITUTION IN MENTAL DISEASE

MEDICINE MONOGRAPHS

VOLUME X

THE SIGNIFICANCE OF THE PHYSICAL CONSTITUTION IN MENTAL DISEASE

BY

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INTRODUCTION

The studies included in this volume deal with the significance of the physical constitution in mental disease. They are to be warmly welcomed as an American contribution to an important movement in medicine that lays stress on the *human individual*, or the *person*, as such, aside from the "health" that he enjoys or the "disease" that may account for his inadequacy of responsivity when he is "sick."

What a given person under observation is depends upon the fertilized egg-cell (zygote) he started with and the reactions that this and its derivatives have successively undergone with physical, chemical and psychical influences in the environment up to the moment of examination. Each person (human phenotype) is unique; there is no other precisely like him in the world. Each human person must be studied singly, if we desire to know how he came to be and to get clues as to what he may become.

But, despite the uniqueness of each person, there are resemblances among human phenotypes, resemblances in external form (habitus), in internal organization, and in rules of reaction. Thus, on comparing a large number of persons, it is possible to divide them, at least roughly, into groups according to similarities (1) in their habitus, (2) in the functional activities of their inner organs, and (3) in their modes of psychobiological adjustment.

Wertheimer and Hesketh have undertaken an examination of mental patients from the standpoint of external habitus, with the idea of testing the contemporarily popular hypothesis that physical habitus and mental reaction types exhibit a more or less definite correlativity.

Their review of the history of the classification of body types may bring surprizes to many who have assumed that interest in such classifications has only recently been exhibited. But every student of the history of medicine must know that physicians have, from the earliest times on, been interested in physical constitution and its relation to health and disease. It was only the brilliant studies of bacteriological

etiology that temporarily suppressed this interest until its recent revival. Today, studies of the bodily constitution of persons and of their relations to disease readiness and to particular types of physical and psychical reaction are again being vigorously prosecuted. Indeed, such studies promise to command an increasing amount of effort in all clinical institutes during the years just ahead of us.

The authors in their studies of habitus have made use both of the method of *simple observation* and that of *exact measurement* (*anthropometry*). They have paid particular attention to methods of correlating "observation types" with so-called "constitutional indices;" and they have, themselves, devised a new anthropometric index (based upon four simple measurements). The determination of this index yields results that appear to stand in definite relation to the different body types (asthenic, athletic and pyknic) that are based upon simple inspection. The influence of age and growth as factors of displacement of body types is especially emphasized as very significant; the authors seem to have proved that for the pyknic type particularly the incidence increases with advancing age.

To the psychiatrist, as well as the internist, the critique here offered of Kretschmer's views regarding the correlation of psychoses and of prepsychotic personalities with body types as expressed in his book *Physique and Character* will be especially welcome. The suggestion that the terms "syntropic" and "idiotropic" be substituted for the terms "syntone" and "schizoid," respectively, in describing the affective attitude toward the personal and social environment would seem to be wise for reasons both of etymology and "tact." The use of the terms "manic-depressive reaction type," "schizophrenic reaction type" and "organic reaction type" is in accord with A. Meyer's emphasis upon a genetic-dynamic psychiatry as contrasted with the "disease-entity" psychiatry of the more rigid nosologists.

In general, the results of the studies made with the authors' index are confirmatory of the view that schizophrenic reaction types and idiotropic pre-psychotic personalities are predominantly associated with asthenic, athletic or dysplastic habitus (high index values) and that manic-depressive reaction types in persons over 30 years of age are predominantly related to the pyknic and pyknoid habitus (low index values).

The perusal of this volume is warmly recommended to all students of internal medicine and psychiatry. It seems probable that the authors' work will go far toward stimulating interest in an important chapter of the "biology of the person."

LEWELLYS F. BARKER.

Baltimore, November 3, 1926.

THE SIGNIFICANCE OF THE PHYSICAL CONSTITUTION IN MENTAL DISEASE

EARLY STUDIES OF BODY TYPES

The question of a connection between external appearance and mental functions has been an ancient preoccupation of the human mind. In following the historical development of this subject, one finds that there enters nearly always into the discussion the preconceived intuitive idea of an essential unity between the morphological and psychic aspect of the individual. This varies only more or less formally with the development of philosophical ideas concerning the relations of mind and body. It thus happens that until comparatively recent times whenever we look for precise definitions of supposed body types we find psychobiological elements, like physiognomy, general attitude and posture entering into the description, and when we examine descriptions of personality or temperament types we find admixtures of signs taken from humoral pathology, physiology and morphology.[1]

The Hindus (53) (88) distinguished three types of man, called symbolically the hare, the bull, and the horse, and three types of woman, the deer, the mare, and the elephant, supposedly characterized by special qualities of body outline, size of genitals, hair, voice, emotional tendencies, etc. The literature on the doctrine of temperaments, based on Galen's theory of Krasis,[2] contains descriptions with a similar mixture of morphological, physiological, and psychological elements, which makes it often difficult, if not impossible, to determine what the various authors meant by their descriptions of temperaments.

[1] Compare the derivation of such words as hypochondriacal, phlegmatic, etc., and the traditional body types of dramatic characters such as Henry Percy (Hotspur) and Falstaff in Shakespeare's "Henry IV," Hamlet, the rejuvenated Faust and Mephisto. In order to realize how closely body type and character are interwoven in the eyes of the spectator, one has only to attempt to visualize Hamlet looking like Falstaff, or Falstaff having the physique of Mephisto.

[2] The Greek word κρᾶσις (mixture of body fluids) = temperies, the root of the word temperament.

This holds true also for the nineteenth century medical literature concerning temperaments. The "classical constitutions," the lymphatic, the sanguine, bilious, etc., were still taught in the course on the practice of medicine by Sir Grainger Stewart at Edinburgh in 1890 (58). An extreme and ludicrous example is the distinction of the hemorrhoid and melancholic temperament by Stahl (81), the forerunner of Lavoisier. It is not astonishing, therefore, that the knowledge of morphological body types made very slow progress. The history of racial anthropology affords an analogy where Linnaeus, the first scientist to give man a place in the "natural system," gave a description of four races, Europaeus albus, Americanus rubescens, Asiaticus fuscus and Africanus niger in which the main characteristics include skin color, body shape, posture and temperament (Scheidt, p. 5 (75)).

BEGINNING OF MEDICAL ANTHROPOMETRIC STUDIES

In medical literature the studies of morphological-physiological types and temperaments, peculiarly intermingled as they were, were from the beginning of scientific medicine influenced by the important consideration of disposition to disease. Hippocrates knew a habitus phthisicus and apoplecticus. Galen taught that the human constitution (κατασκευή), in the Galenic and post-Galenic writings often used synonymously with habitus (ἕξις), nature (φύσις) and disposition (διάθεσις), comes through a disease process (πάθος) to a state of disease (νόσος) (Günther, p. 2 (28)). It was not until 1860 that Wunderlich, who himself distinguished more physiologically an irritable, strong and limp constitution (Wuth, p. 5 (93)), spoke of a promising program for exact analysis and measurement of the physical constitution (Günther, p. 3 (28)). The rise of cellular pathology on the one hand, and bacteriology on the other, prevented for a long time the realization of this program.

The Italian de Giovanni (24) seems to have been the first physician who attempted on a large scale the investigation of physical habitus in relation to disease. He fell into the extreme of trying to prove that "the cause of the special morbidity of the organism resides in its special morphology" (p. 66). His methods, however, were imperfect, his conclusions very dubious. The historical antagonism between mor-

phological constitutional research and bacteriology is well illustrated in his book, as when he speaks of his reticence toward "the parasitic theories" (p. 96–97) and claims that in the human body the diplococcus of the saliva can be transformed into the pneumococcus and meningococcus (p. 96). Nevertheless, his researches were both stimulating and suggestive and he became the founder of a productive school of clinical anthropometrists (Viola, etc.). De Giovanni described four morphological types, or "combinations," as he calls them, mainly on the basis of the development of body cavities. These "combinations" (to be discussed later) are, as Bauer (5) states, the prototypes of the body forms described by Kretschmer (44), who has attempted to correlate them with the incidence of definite forms of mental disease.

ANTHROPOMETRIC STUDIES IN PSYCHIATRY

In psychiatry, just as in general medicine, consideration of the physical constitution is bound up for a long time with the post-Galenic descriptions of "temperaments" in what we now know to be a strange mixture of fancies and facts. It seems interesting that in the very beginning of scientific psychiatry Esquirol (17) compiled statistics regarding the external appearance of his patients. He made the following table (p. 157):

Habitudes extérieurs du corps	embonpoint médiocre	122
	maigreur	60
	obésité	6
Taille[3]	élevée	102
	petite	19

In the same chapter Esquirol states that generally those patients who are strong and robust (sanguine temperament) tend more to an acute course of the psychosis with more definite crises, whereas others (with a lymphatic temperament) tend to a more chronic and dementing course of the disease.[4] This passage where Esquirol mentions the physical constitution of his mental patients is the more remarkable

[3] La taille (French) = body height = stature (anthropological terminology).

[4] Compare also Pritchard (70). "It has been observed by M. Esquirol, that when persons of the lymphatic or phlegmatic temperament, or those who have a pale exanguious constitution, fall into mania or monomania, their disorder is more liable than that which occurs in other constitutions to pass into dementia or incoherence."

because it is the only one where Esquirol, whose nosological classification is otherwise purely symptomatic–scholastic, seems to anticipate in a way the modern distinction of affective (manic-depressive) reaction types with acute, attack-like course and schizophrenic reaction types with more chronic and often deteriorating development.[5]

The modern scientific morphological studies in general medicine, undertaken with the view of finding correlations with definite systemic diseases (de Giovanni) were suppressed by the sensational success of cellular pathology and bacteriology. They were revived only with the rise of modern endocrinology. This renewed interest in morphology was based on the observation that, due to certain endocrine disorders, individuals show morphological changes and that these individuals, as for example in cretinism and acromegaly, tend to lose their racial and family resemblance, but show a morphological similarity among each other (Wuth (93), p. 1–2). These endocrinological studies were fruitful in certain definitely pathological cases. In regard to morphological (and psychological) types they have yielded very little that may be regarded as definitely established.

The investigation of the physical constitution in psychiatry was deflected in a different direction. Influenced by Gall, though opposed to his doctrines, Morel (61) propounded his theory of degeneration which has influenced psychiatric thought profoundly until the present day. Physical signs of degeneration were the basis of Morel's ideas; he found it necessary in order to understand degeneration to study the "natural history of man." His knowledge of physical signs of degeneration, however, was scanty. He laid particular stress on the variations in the human ear, of which he described one form, the so-called Morel ear. On this subject sprang up a whole special literature in psychiatry. In his later work, "Traité des maladies mentales," Paris, 1860, where he stresses again and again bodily degeneration as the basis of hereditary mental disease, he devoted only five of 860 pages to the description of physical signs of degeneration. The

[5] It may be noted as a digression that Esquirol also knew the occurrence of cyanosis in hands and feet of schizophrenic patients. In the good description of a case under the diagnostic heading of "melancholia," which leaves no doubt that the case is one of what we would now call schizophrenia, he says: "Ses mains sont souvent violettes ainsi que ses pieds."

reticence of Morel is in contrast to the enormous expansion of the doctrine of morphological degeneration signs by Lombroso, who studied morphological anomalies primarily from the point of view of criminology. Both Lombroso's anthropological and statistical methods were uncritical. Many of his results were disproved when more exact methods were employed. Little today remains valid of Lombroso's life work, and whatever is left of the physical signs of degeneration, the stigmata hereditatis as Morel called them, belongs to the sphere of constitutional variations and diseases. Theoretically these physical signs of degeneration, as they are wrongly called, are of great interest. Their study with regard to etiology and correlation with other morphological signs is by no means completed. Figure 1 shows an example of a morphological characteristic which has been regarded as environmentally determined, but which is really constitutional, namely the atrophy of the fifth toe in man. Schultz (79) describes a morphological variation which might easily be mistaken for a constitutional racial stigma but which he proved to be environmentally determined, namely the peculiar position of the fifth finger of the Rama Indian (see fig. 2). Lombroso's interpretation of "physical signs of degeneration," namely, his theory of anatomical-biological regression in born criminals to the morphological status of lower races, prehistoric man and animals (Lombroso's follower, Kurella, spoke of primatoid skull forms) had to be largely given up. Sommer (quoted by Fischer (19)), who to some extent has recognized Lombroso's teachings, has pointed out that Lombroso has confused two separate problems: first, the problem of whether the delinquente nato really exists; secondly, if he does exist whether this abnormality is characterized by significant morphological features. Just as Lombroso's methods were challenged there was also a strong criticism of the uncertainty in the definition of his object of study, namely what really constituted a born criminal. There is a certain analogy between the formulation of this problem and the problem which at the end of the 19th century confronted physical anthropologists who used exact anthropometric measurements in psychiatry. Having successfully studied and differentiated ethnic groups with modern methods, anthropologists attempted to distinguish with anthropometric methods the "insane" from the "normal" individuals. In an excellent paper, which from

the point of view of anthropometric methods is in many ways as useful today as it was then, Hrdlička (35) formulated a program: "The new program is, after being able to define the human normal, to separate the abnormal from the normal, and to classify, if possible, the ab-

FIG. 1. FOOT OF AN EGYPTIAN MUMMY OF THE XI DYNASTY—ABOUT 1300 B.C.—CENTURIES BEFORE BOOTS APPEARED IN EGYPT

The last phalanx is diminutive, and its joint is ankylosed. From photo by Dr. George Sobhy, Cairo, in Journal of Heredity, 1917.

normal. And it is here, in this its latest application, where anthropometry encounters the domain of medicine. As an aid in determining the abnormal in man, it serves both the general student of mankind and the clinician, and they really join hands at this point, the anthropologist and the physician" (p. 523). It is, however, exceedingly

difficult in psychopathology to make a generic distinction between abnormal and normal. With the closer dynamic study of psychopathological conditions it became more and more apparent and may be regarded as well established today that elements of certain psychopathological reactions reach far into the sphere of psychopathic personalities (that is to say, of people who though constitutionally slightly abnormal may not suffer from a circumscribed mental disease) and even far into the group of normal people. This is true also for

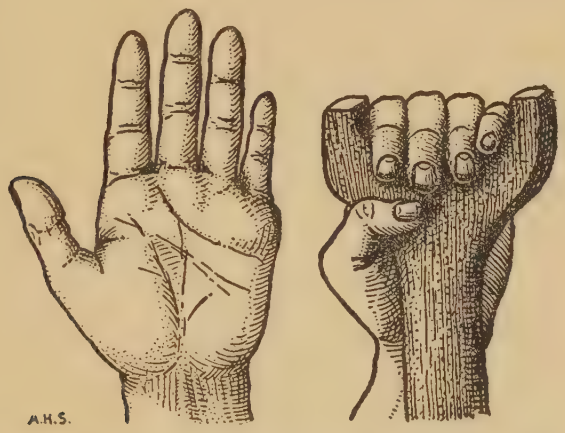

FIG. 2. SKETCH OF HAND OF A RAMA INDIAN AND OF THE MANNER IN WHICH THE HANDLE OF A NICARAGUAN PADDLE IS GRIPPED

Note the position of the little finger. This drawing shows a morphological variation easily mistaken for a constitutional racial stigma.—After Schultz (79).

the two large and most common psychopathological reaction types, the manic-depressive and the schizophrenic. It is, therefore, not astonishing that generally valid significant morphological correlations with "normals" and "abnormals"[6] were not found, and that on the other hand, with the clarifying of our psychiatric diagnostic conceptions, contrasts between two mental diseases offer a better object of study for anthropological correlations.

[6] The impasse which is easily reached by making the distinction "normal" and "abnormal"—that is to say a "monotype standard"—the starting point of investigations, is of course not confined to psychiatry alone. The early X-ray studies of the stomach where all sorts of atonic conditions were described on the basis of a preconceived normal one-type standard are an example. This subject is well discussed by Mills (59).

Modern heredity studies in psychiatry have gone through an analogous development. The pioneer researches of Koller and Diem have shown that there are no very significant differences as regards the quantitative incidence of mental disease in the ancestry of "normal" and "abnormal" individuals. The tendency of modern heredity studies in psychiatry has been more and more to draw on all even slightly abnormal relatives and finally on all members of the family (see Kahn, p. 48 (38)). Despite the progress of modern heredobiological research in psychiatry, the knowledge of even a complete family history does not give a clue to the pathogenetic factors of psychoses. For this study the modern dynamic and analytic point of view proved more fruitful, and, inasmuch as it emphasizes changeable psychogenic and environmental factors, more practically and therapeutically useful.

HEREDITY AND CONSTITUTION

However great the advances in the knowledge of exogenic etiological factors of disease have been in the various stages of medical progress, the age-old and unavoidable experience both in general medicine and psychiatry, that different individuals react differently to similar kinds of exposure, has always prevented the suppression of the recognition of hereditary factors of disease, from the "res naturales" of the old physicians to the "constitutional factors" of modern pathologists. The term constitution is used by different pathologists in a very different and arbitrary way. Without going into detail in the examination of these different definitions, it seems correct to say, that most of these formulations are more logically precise than practically directly applicable according to our present state of knowledge. It is not yet possible in human pathology always to distinguish with exactness between hereditary (often used synonymously with unchangeable) and acquired signs. We are forced to assume that the Mendelian laws of heredity apply also to anthropology in the widest sense (Eugen Fischer (18), p. 136). In fact it has been claimed that the only binding proof of the hereditary character of any sign, is the knowledge of its mode of transmission according to the Mendelian laws (Fischer, l. c., p. 137). In the human organism, however, the delimitation of "hereditary units" is infinitely more complicated than in plants.

Borchardt (9) comes to the conclusion that it is not possible to divide constitutional anomalies into hereditary and acquired. The concept of constitution cannot have a heredo-biological foundation alone. He therefore also disagrees with Tandler's distinction between constitution and condition. If the difficulty of distinguishing between hereditary and acquired traits be true in the sphere of human morphology it is self-evident in the sphere of psychobiological integration. The formulation of constitution as disposition to disease, as a measure for the resistance of the organism toward pathogenic influences (Martius, Strümpell) is too narrow, since disposition to disease is only one correlative sign or a correlative combination of signs among many others (Lubosch (52), p. 108). To confine constitution to morphology alone (Hering (32)), is not practical and an unnecessary restriction. Without venturing to give a definition which would be theoretically binding, one may therefore, for the purpose of investigations like these, speak of the human constitution as the correlative unity of those morphological, physiological and psychobiological developments of the individual which are definitely more influenced by heredity than by environment.

COMPARISON OF CLASSIFICATIONS OF MORPHOLOGICAL TYPES

Attempts to describe morphological constitutional types have been made very frequently. None of these classifications, however, obtained final recognition (Wuth, l. c., p. 5). In many the very nomenclature shows the influence of physiognomical-symbolical ideas. Table 1 gives a cursory schematic survey of the various classifications of body types.[7]

Such a comparison of type constructions may give rise to the serious and not unjustified objection that these types originated at different ages and through totally heterogeneous methods, scientific and fanciful. Moreover it may appear inappropriate, or even unjust, to chart

[7] Compiled from Aschner (2), Bauer (5), Bean (7), Brugsch (11), Bryant (12), Carus (13), Davenport (15), Dubreuil-Chambardel (16), de Giovanni (24), Hallé et Thiltaye (29a), Kern (40), Kretschmer (44), Kundrat (48), Manouvrier (54), Mills (59), Pende (65), Rostan (73a), Stockard (85), Stratz (90). A number of these publications contain good illustrations. The illustrations show in many instances an unmistakable similarity between the types described by different authors. The photographs in the paper by Mills (1917) can be especially recommended. The photographs given by Bach (3) showing the comparison between the typical pyknic habitus and the physique of a professional wrestler are instructive.

TABLE 1

Classifications of body types

	1	2	3	3a	4
Hippocrates		Habitus apoplecticus	Habitus phthisicus		
Hallé-Husson (1821)	Tempéramens partiels:	Abdominale	Thoracique	Céphalique	
Rostan (1828)	Type musculaire	Digestif	Respiratoire	Cérébral	
Walker (1852)	Locomotive beauty (Diana)	Nutritive beauty (Venus)		Mental beauty (Minerva)	
Carus (1853)	Athletic, lascivious, plethoric arterial constitutions (bones and muscles strongly developed)	Phlegmatic, boeotic, plethoric venous, choleric, apathic constitutions (region of digestive organs prominent)	Asthenic, sensory, pneumatic, chlorotic, phthisic, lymphatic constitutions (narrow chest, long body, skeleton and muscles poorly developed)	Cerebral constitution (delicate)	Sterile, atrophic constitutions (general and special sex characteristics little developed)
Rokitansky-Beneke	Normal type; disposition to unconstitutional diseases only	Types with disposition to carcinoma; hyperplastic	Types with disposition to tuberculosis; hypoplastic		
Kundrat					Primary vegetation disorders (hypoplasias, etc.)
De Giovanni	Second combination; plethoric	Third combination	First combination; phthisic		

Manouvrier	Mesoskèles	Brachyskèles (mikroskèles)	Makroskèles		
		Brevilignes	Longilignes		
Viola	Normosplanchnic type	Megalosplanchnic type	Microsplanchnic type		
Pende		Hypervegetative biotype	Hypovegetative biotype		
Lombroso-Kurella					Primatoid anomalies (similarities to primates)
Sigaud	Muscular type	Digestive type	Respiratory type	Cerebral type	
Bryant	Herbivorous type		Carnivorous type		
Tandler	Hypertonic		Hypotonic		
Bauer		Arthritic habitus	Asthenic habitus		
Mills	Sthenic	Hypersthenic	Hyposthenic, asthenic		
Brugsch	Normal chested	Wide chested	Narrow chested		
Kretschmer	Athletic type	Pyknic type	Asthenic type		Dysplastic types
Davenport	Medium	Fleshy	Slender biotype		
Bean		Mesontomorph	Hyperontomorph		
Stockard		Lateral type	Linear type		
Aschner	Normal	Broad	Slender		

side by side the classical traditional types of Hippocrates, the romantic-symbolic system of Carus, the esthetic mythological analogies of the English anthropologist Walker, the dogmatic pathological "combinations" of de Giovanni, and the clinical anthropometric findings of Manouvrier, Viola, Brugsch, and Davenport, the brilliant intuitive divisions of Sigaud and his pupils which have been put to clinical use by Julius Bauer (5, 6), the pathological-anatomical observations of Rokitanski, Beneke and Kundrat, the anatomical types of Mills and Stockard, and the careful clinical descriptions of the psychiatrist Kretschmer. Nevertheless, it seemed worth while to collect and tabulate this not easily accessible material, because it seemed to illustrate several important considerations.

The influence of physiognomical-symbolical notions and of clinical pathological observations, expressed in the nomenclature itself again and again, is striking, especially if it is taken into account that many of the authors did not know about one another. One of the fundamental mistakes of some of these classifications Kretschmer (44) has expressed very clearly, speaking of the types of Sigaud and his pupils: . . . . "their occasionally correct observations of detail are forced into a scheme which has been constructed purely speculatively, and at the basis of which—if we may express ourselves somewhat naïvely for the sake of clarity—lie the following ideas: there are (1) men of reason—these must have a big head; (2) eaters, these must have a fine belly; (3) acrobats, these must have splendid muscles; and (4) runners, these must have a fine pair of lungs" (p. 17).

The various types given in the groupings of different authors do not, of course, correspond with each other in the simple fashion schematically indicated on the chart. The question arises as to what extent they are comparable. There is no doubt that there is a thread of uniformity and that in a far-reaching way most of these classifications aim to express similar body forms. A few are almost identical. It is difficult to determine how close this correspondence is between the groupings of different authors, but the difficulty seems almost equally great when the attempt is made, with any amount of accuracy, to assign an individual to any one type of these morphological classifications.

OBSERVATIONAL AND ANTHROPOMETRIC METHODS IN GENERAL

With regard to methods the problem arises, whether in the systematic differentiation of recurrent forms of habitus of individuals one should rely on exact anthropometric measurements alone, on descriptions alone, or on a combination of both. This problem has a parallel in the history of racial anthropology. The extreme number of anthropometric measurements used by the Hungarian Török, who took five thousand measurements of the skull alone, was opposed by Sergi who proposed at one time to omit measurements altogether and rely on observations alone (Haddon (29), pp. 40–41). Experience with patients seems to indicate that the question is not such a simple one of either the one or the other or both. Even when a decision is made that inclusion of measurements in the working scheme is necessary there still remains the greater problem of the choice of measurements to be used. This problem is not simplified by the fact that since investigations of this character are of a clinical rather than an anthropological nature, they must in all respects be adapted to the needs of the clinic.[8]

It is evidently possible to recognize recurring (i.e., typical) body forms from observations alone. The process of this recognition is a complicated one, an exact observation of certain details combined with the realization of the general impression of the individual in toto. In these observations the personal equation plays a not insignificant part. Undoubtedly this general unison impression is very useful and important, and requires training and technique.[9]

This procedure of judgment from observations has been very much criticized. Unfortunately the average medical clinician is not qualified to raise the objection that it is impossible to size up recurrent body types from general impression because as a rule he does not, during the examination of a patient, inspect the nude human body in an erect posture and at an appropriate distance. This is the only way to get a clear impression of the general body configuration type. The

[8] We are greatly indebted to Dr. Adolph H. Schultz, Associate Professor of Physical Anthropology, Johns Hopkins University, for his never failing encouragement, advice and critique throughout the course of this study.

[9] We found it useful in the process of training ourselves to compare our observations reached independently and to discuss the discrepancies.

reason why the general practitioner as a rule does not do this is twofold. First, there are obvious practical obstacles with regard to the routine technique of medical examination. Secondly, clinicians are interested mostly in disturbances of body structure when there are more or less pronounced anomalies, as in pathological-endocrine types.

It is a different matter, however, to describe and recognize again more or less accurately certain body types and to prove their existence inductively, study their occurrence statistically and establish quantitative relations with other correlative signs such as the incidence of disease. Racial anthropology is confronted with similar but by no means identical problems. Races are distinguished by observational data, such as color of hair and skin, quantity of hair, shape of head and by anthropometric data relative to body proportions. Just those data which are most useful in racial anthropology, however, namely complexion, form of hair, skull form, eye color and stature, are apparently of least importance in the differentiation of smaller non-racial groups of individuals such as groups afflicted with physical or mental disease.[10] For this purpose the study of the body proportions, and particularly the development of the body cavities, as de Giovanni has already recognized, is of first importance.

In psychiatry the morphology of the skull has often been regarded as of very particular significance. This primitive-symbolic belief that the morphology of one single part of the human body, quite apart from the rest of the body, must have an exceptional value as an indicator of mental faculties,[11] has probably also something to do with

[10] It is for considerations like these that the expression "disease races" used by Dr. G. W. Draper of New York seems unfortunate.

[11] Compare the head formation in statues of the Buddha. "It will also be noticed that the Buddha images have certain physical peculiarities, of which the most conspicuous is the ushnisha or protuberance on the top of the skull. Technically this appears to be derived from a western form of headdress, but in significance it is to be classed with the physical characters attributed by Indian physiognomists to the Superman, the Mahapurusha. This ushnisha serves to distinguish the Buddha figure from that of a mere Brother, for the head of the Bhikkhu is always shaved bare and without the Buddha's bump of wisdom" (Coomaraswamy (14), p. 331). The ushnisha does not grow only as an attribute of the Buddha with his growing wisdom and after his illumination, but is already present as a "constitutional sign" in all statues depicting Buddha as a child. See Adam (1), "Buddha as a child," plate 13.

the age-old observation that microcephaly is not infrequently associated with idiocy. That the opposite is not true, namely that a large head does not denote a superior intelligence or yet a deficient one, was already known to Perdulcis (66), who states this explicitly.[12] There are only two points which give the morphology of the skull an exceptional position. One is the undoubted fact that there is a certain inter-relation between the development of the brain and the cranium. The scientifically well-established facts concerning this inter-relation are, however, very few. Reichardt's (73) finding of relatively small skull cavity and relatively high specific gravity of the cranium in schizophrenic, especially catatonic patients, is interesting and significant. The other point is that the formation of the skull may be, to some extent, an indicator of the formation of the rest of the body especially of the skeletal system, as was already known to Hippocrates. The teaching of Gall[13] has left behind it the belief that whatever correlation there may be between morphological and psychological traits must be expressed particularly clearly in the form of the skull. Peterson (67) regretted that we have no studies of the psychic histories of tribes who produced artificial malformation of their heads. It seems also significant in this connection that the mental reactions of otherwise crippled children and adults have received very little attention on the part of psychiatrists. De Giovanni and Viola were the first to prove that head and skull measurements can be neglected to some extent in constitutional researches. Borchardt (10) in a recent study agrees with this view.

Some authors, like Kretschmer (43), claim that description goes very much further than measurements, and that description alone is entirely sufficient to differentiate types. From anthropometric measurements he expects only a more exact formulation. He has supplemented his book with a comparison of the averages of absolute

[12] "Alioquin magnitudo capitis ut non bonam, sic non semper malam per se constitutionem indicat" (p. 62).

[13] It is not intended here to discuss the historical significance of Gall's teaching. That Gall's influence was not entirely a side-tracking one for neuropsychiatric research can be seen from the fact that one of the first cases of aphasia with an autopsy report of a lesion in the left frontal region of the brain was published by Thomas Hood in the "Phrenological Transactions," a journal devoted to Gall's teaching (Walter (91)).

measurements,[14] a procedure anthropologically of little value. Mayer-Gross (57) has gone even further and believes that the study of morphological types in psychiatry should be independent of the exact methods of physical anthropology, and more a branch of psychology which can be compared with the study of other expressive phenomena like "graphology." This lack of distinction between physiognomic expression and mensurable morphology reminds one of the old temperament theories. Scheidt (76), on the other hand, emphasizes that these studies can have conclusive results only if they make use of the commonly accepted methods of physical anthropology, the uniformity of which has been established more or less successfully at international congresses of physical anthropology. (Compare also Hrdlička: Anthropometry (34)). It is true that every new problem is apt to call for certain adaptations and alterations in technique, but the same principles should be followed.

The task of an investigation of morphological and psychopathological correlations[15] therefore resolves itself into the following questions: can recurrent typical body forms be determined by inductive anthropometric methods; can body types, differentiated by observation and description, be correlated with exact anthropometric data; are there any correlations between anthropometric and psychopathological findings?

THE MATERIAL OF THIS STUDY; PROCEDURE OF INVESTIGATION

The material of this study consists of sixty-five male patients chosen at random without any consideration of diagnosis or physical habitus. The patients were taken from the wards of the Henry Phipps Psychiatric Clinic, Johns Hopkins Hospital, and from the Spring Grove State Hospital, Catonsville, Maryland.[16] A series of thirty-one female

[14] In physical anthropology absolute measurements such as head length or leg length are used as well as indices. An index expresses the percental relationship between two or more measurements. For example, the cephalic index $= \left(\frac{\text{breadth}}{\text{length}} \times 100\right)$. Index values are generally regarded as more significant than absolute values.

[15] By "correlation" is understood "a more frequent concurrence of two phenomena than would be expected from a mere chance coördination" (Scheidt (75)).

[16] We acknowledge gratefully the coöperation of Dr. J. Percy Wade, Superintendent, Spring Grove State Hospital.

patients who were observed and measured at the same time[17] is omitted from this study for the following reasons: anthropological data from female individuals are not strictly comparable with those of male individuals; dimensional changes of habitus at different ages are more marked in women than in men (Aschner (2), p. 125); the physical types described by Viola, Sigaud, and Kretschmer are more difficult to recognize in women (Bauer (6) mentions this for Sigaud's types, p. 1082); in very many anthropological studies women are omitted. It seemed that if there are significant differences in morphological habitus between individuals with different mental diseases, as Kretschmer has claimed, these differences should be at least indicated in an accurate study of a relatively small number. Since our material is diagnostically entirely unselected (except that the routine procedure of the Henry Phipps Psychiatric Clinic prefers early and diagnostically complicated or therapeutically promising cases, and the material from the State Hospital naturally tends to a predominance of chronic cases), a variety of diagnostic groups is represented. Kretschmer's book and the studies of most investigators based on his book deal only with manic-depressive and schizophrenic cases.

The patients are classified in four diagnostic groups:

1. Predominantly affective (manic-depressive) reaction types
2. Predominantly schizophrenic reaction types
3. Organic reaction types
4. Psychopathic personalities and psychoneuroses

This division was made purely for practical purposes in order to avoid a larger number of diagnostic groups with only a few individuals in each group.

In the first group are placed nineteen cases of affective psychoses,[18] both cases with more or less typical course of manic-depressive psychosis and cases which, though predominantly affective, present certain other features such as schizophrenic-like reactions. The special diagnosis of each case is given in table 2. In the same way there are in the second group twenty-five predominantly schizo-

[17] A study of these female patients is in progress.

[18] This term is used in a similar meaning by Kahn in a recent genealogical-clinical study (37).

TABLE 2

NUMBER	NAME	DIAGNOSIS	PRE-PSYCHOTIC PERSONALITY	BODY TYPE	INDEX
		Predominantly affective reaction types			
1	E. L.	Hypochondriacal depression in intellectually debile person	Syntropic	Pyknoid	237
2	W. P.	Depression with unreality feelings following acute anxiety state		Pyknoid (athletic)	247
3	D. W.	Manic-depressive reaction type; depressive phase		Pyknoid (athletic)	302
4	M. C.	Depressive personality with circumscribed aggravations	Syntropic	Pyknic	212
5	R. R.	Agitated depression—third attack	Syntropic	Pyknoid	224
6	L. M.	Manic-depressive reaction type; depressive phase	Syntropic	Pyknic	182
7	G. N.	Mania; previous attack of chronic mania	Syntropic	Pyknic	206
8	J. H.	Manic-depressive reaction type; manic phase with schizophrenic elements (periods of inaccessibility, mutism, day dreaming and catalepsy); previous depressive attack		Asthenic (dysplastic features)	325
9	D. K.	Psychoneurotic depression-third attack		Pyknoid (athletic)	296
10	B. R.	Manic-depressive reaction type; fourth depressive attack	Syntropic	Pyknic	154
11	H. G.	Manic-depressive reaction type; hypomanic state. Previous manic-depressive cycles		Unclear	315
12	H. A.	Reactive depression with protracted fatigue symptoms		Pyknoid (athletic)	255
13	R. M.	Manic-depressive reaction type; depressive phase	Syntropic	Athletic	266
14	H. D.	Depression with somatic delusions; previous psychotic attack at fourteen		Unclear	257
15	T. D.	Agitated depression, second attack; cerebral arteriosclerosis	Syntropic	Pyknoid	262
16	W. F.	Manic-depressive reaction type; second depressive attack	Syntropic	Pyknic	167
17	T. B.	Manic-depressive reaction type; depressive phase. Previous manic-depressive cycles	Syntropic	Pyknoid (athletic)	276
18	E. F.	Depression with schizophrenic elements (auditory and visual hallucinatory experiences and ideas of reference)	Syntropic	Asthenic	291

19	M. J.	Manic excitement with schizophrenic elements (feelings of influence, revelation experiences, hallucinations of God's voice through canary bird)		Asthenic-athletic M-F	326
		Predominantly schizophrenic reaction types			
20	N. S.	Schizophrenic reaction type	Idiotropic	Asthenic (dysplastic features)	313
21	H. T.	Schizophrenic paranoid reaction type	Idiotropic	Asthenic-athletic M–F	299
22	W. S.	Schizophrenic paranoid reaction type. Catatonic stupor		Athletic	306
23	B. S.	Catatonic stupor	Idiotropic	Asthenic-athletic M-F	314
24	C. K.	Anxiety state with schizophrenic paranoid development		Pyknoid (athletic)	199
25	J. H.	Schizophrenic paranoid reaction type	Idiotropic	Asthenic-athletic M-F	292
26	R. C.	Schizophrenic reaction type	Idiotropic	Unclear	267
27	J. C.	Schizophrenic paranoid reaction type with early catatonic phase		Athletic (dysplastic features)	298
28	H. B.	Schizophrenia—simple type	Idiotropic	Asthenic (dysplastic features)	337
29	M. B.	Schizophrenic paranoid reaction type	Idiotropic	Athletic	248
30	E. W.	Schizophrenic reaction type	Idiotropic	Asthenic-athletic M-F (dysplastic features)	270
31	G. G.	Schizophrenic paranoid reaction type		Asthenic (dysplastic features)	315
32	J. H.	Schizophrenic reaction type		Asthenic-athletic M-F	252
33	G. W.	Schizophrenic paranoid reaction type		Athletic	268
34	H. O.	Schizophrenic reaction type		Asthenic-athletic M-F	260
35	A. B.	Schizophrenic reaction type	Idiotropic	Athletic	304
36	E. S.	Schizophrenic paranoid reaction type	Idiotropic	Asthenic-athletic M-F (dysplastic features)	333
37	C. F.	Schizophrenic reaction type; scattered deterioration	Idiotropic	Pyknoid (asthenic)	242
38	G. N.	Schizophrenic reaction type; scattered deterioration	Idiotropic	Asthenic (dysplastic features)	282
39	A. G.	Schizophrenic reaction type	Idiotropic	Pyknoid (athletic)	294
40	W. B.	Schizophrenic reaction type		Pyknoid (athletic)	229
41	J. H.	Schizophrenic reaction type		Pyknic (dysplastic features)	178

TABLE 2—*Continued*

NUMBER	NAME	DIAGNOSIS	PRE-PSYCHOTIC PERSONALITY	BODY TYPE	INDEX
		Predominantly schizophrenic reaction types—Continued			
42	A. B.	Schizophrenic reaction type; social recovery	Idiotropic	Athletic	263
43	R. D.	Schizophrenia—simple type	Idiotropic	Asthenic-athletic M-F	302
44	M. S.	Schizophrenic reaction type		Athletic (dysplastic features)	254
		Psychopathic personalities + psychoneuroses			
45	R. O.	Psychopathic personality; alcoholic hallucinosis		Asthenic-athletic M-F	284
46	B. R.	Chronic alcoholism		Athletic	299
47	J. G.	Intellectual debility; hysteria	Idiotropic	Pyknoid (asthenic)	271
48	W. B.	Constitutional psychopathic inferiority; emotional instability		Asthenic-athletic M-F	311
49	J. H.	Post-traumatic hypochondriasis		Pyknic	224
50	F. W.	Supra-orbital pain on psychogenic basis	Syntropic	Pyknoid	243
51	J. M.	Feeblemindedness		Asthenic-athletic M-F	296
52	W. N.	Constitutional psychopathic inferiority; emotional instability; alcoholism		Asthenic-athletic M-F	282
53	L. S.	Atypical tabes (?); hysterical reaction	Syntropic	Pyknic	153
54	J. A.	Feeblemindedness with schizophrenic-like psychotic episodes		Pyknic	197
55	R. W.	Constitutional psychopathic inferiority; antisocial tendencies		Pyknoid (athletic)	242
		Organic reaction types			
56	C. P.	Epilepsy		Asthenic	298
57	C. D.	Dementia Paralytica		Pyknoid (athletic)	227
58	F. S.	Dementia Paralytica with previous depressive attack		Pyknoid (dysplastic features)	234
59	C. Å.	Cerebral lues		Pyknic	244
60	C. C.	Epilepsy	Syntropic	Pyknic	186
61	J. R.	Epilepsy		Pyknoid (athletic)	243
62	G. I.	Metencephalitic Parkinson syndrome	Syntropic	Pyknic	199
63	A. S.	Dementia paralytica		Pyknic	194
64	L. B.	Depressive psychosis following encephalitis lethargica		Asthenic-athletic M-F	276
65	G. A.	Left hemiplegia		Asthenic-athletic M-F	304

phrenic patients with the special diagnosis indicated. In the third group are eleven cases of psychopathic personalities and psychoneuroses, including also cases of chronic alcoholism, a diagnostically not quite clear case of post-traumatic hypochondriasis, and, merely for the practical considerations mentioned above, cases of feeblemindedness. In the fourth group are ten cases of organic reaction type including epilepsy.

The nosologically indefinite arrangement of cases in the last two groups is of little significance inasmuch as the emphasis of the study is naturally on the two more constitutional reaction types of the first two groups. In these first two groups it seemed of special interest to see whether those cases for the sake of which the qualification "predominantly" was introduced showed any special morphological features. The designation of manic-depressive psychosis with schizophrenic features is not intended to indicate a co-existence or blending of different "hereditary units," but is employed merely in order to do justice to the clinical facts of the individual case. It may be added that more or less typical manic-depressive reaction types according to any strict terminology are relatively rare in hospitals, as compared with schizophrenic psychoses, so that serious doubt has been cast on the diagnostic conscientiousness of those investigators who have studied in a relatively short time the same large number of manic-depressive and schizophrenic psychoses (Kolle (42), p. 605).

In the course of the investigation three kinds of data were kept entirely separate, namely,

1. Psychiatric data
2. Data obtained in form of observations
3. Anthropometric data

Each set of data for each patient was separately numbered, and the psychiatric, observational, and anthropometric data not compared until the final correlation. The formulation of the psychiatric diagnosis was written down in the present form (see table 2) before the anthropometric valuations were completed.

DESCRIPTION OF MORPHOLOGICAL TYPES USED

In the classification of morphological types we followed mainly the descriptions given by Kretschmer (44). From the observation of our patients and from exact anthropometric data (to be discussed later) a group of patients seemed to be distinct enough to be classed together as a sub-type or transition type which we shall refer to as pyknoid. The chief characteristics of these types are as follows:

1. The pyknic individual (plate 1) has in profile a round head, the contour of the occiput, top of the skull and profile line impressing one often as a more or less clear circle. The outline of the head is soft

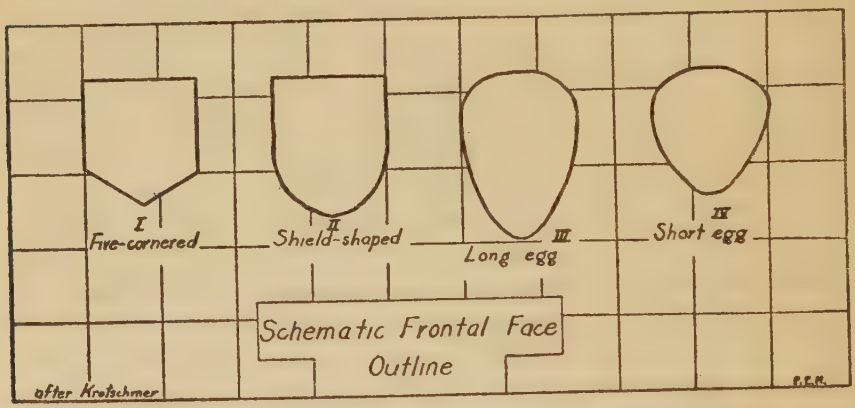

FIG. 3. SCHEMATIC REPRESENTATION OF THE FACIAL OUTLINE

without any sharply prominent parts (like nose or chin). The face has the form of a pentagon or a shield (see fig. 3, I and II) or in many cases a form between the two. It is always definitely broad and soft, quite apart from the fact that it is usually fleshy, especially as regards the nose. There can be no doubt that in the general aspect of the face the impression of a certain harmoniousness and balance is also conveyed by certain physiognomical-psychological characteristics which evidently may be a source of error. The neck is short and full, with the head set a little forward on smoothly rounded shoulders. The line from the tip of the chin to the suprasternal notch is characteristic, inasmuch as it tends to be not an angle but a smoothly

sloping or even a straight line.[19] The hair line usually borders the forehead in a regular unindented curve. Apparently the pyknic type has a tendency to baldness, and when this occurs it seems to be electively regular in outline and with a smooth shiny surface. The trunk is thick set and appears barrel-shaped, with the chest broadening toward the lower part of the body. One might say that the body cavities (head, chest, abdomen) tend to a voluminous development. The limbs are relatively short, as are also the hands. The panniculus adiposus is well developed and the color of the skin is good. The pyknic habitus is most definitely pronounced in early middle age.

1a. There are undoubtedly pyknic admixtures in other cases and in order to do justice to these frequent not so distinct types which impress one as having definitely pyknic components we propose to speak of a pyknoid habitus.

2. The athletic type is characterized by a strong development of the locomotor apparatus so that the bones and muscles stand out in plastic relief. The heavy development of the skeleton is most easily recognized in the clavicles. The neck is strong and the trapezius muscles typically very well developed. The shoulders are large and the trunk tapers down from the broad shoulder girdle to the relatively narrow pelvis, so that the trunk outline from the front can be schematically designated as a trapezoid.[20] The limbs are relatively long, the hands and feet are large and the fingers often of a blunt, thick and "acromegaloid" character. The hair is abundant and the hair line tends to grow in a peak in the center of the forehead, receding in bay-like manner on either side toward the temples. The face has a long egg[21] form (see fig. 3, III). A line which would connect the upper forehead, tip of nose, and chin would be a gentle curve. There is a variant, if one may speak of such, which is on the whole more plump and massive.

[19] The passage in Kretschmer's book (English translation), p. 29 (44), where this trait is described has been wrongly translated so that the meaning has been destroyed. The translator evidently confounded the German word "Sternalende" which means end of the sternum, with the word "Stirne," meaning forehead. This passage has been quoted uncorrected in a number of reviews of the subject.

[20] The Hindus compared this type of trunk with the head of a cow (Tagore (87)).

[21] The Hindus compared a type of face with the egg of a chicken (see Tagore (87), p. 24).

3. The asthenic habitus[22] (plate 2) is characterized by the general impression of a deficiency in volume combined with an average unlessened length, so that these individuals impress one as being taller than they really are. The thorax is long and flat and the shoulders narrow, and the trunk can be schematically described as cylindrical. The legs and arms are long and thin with lean muscles. The face is of short egg form (see fig. 3, IV) and may show hypoplasia in varying degree. The skin tends to be pale, thin, and with but scant fat. The profile is usually markedly irregular. The line which would connect upper forehead, tip of nose and chin tends to be angular on account of the disproportion between the long nose (which seems sharp on account of lack of fatty upholstering) and the small mandible. When the hypoplasia of the jaw is not so marked there may be noted simply a long nosed profile. The neck is thin and seems elongated. The body hair is scanty and these individuals may also tend to baldness, but with an irregular outline and a more or less wrinkled surface. Other individuals who on account of some signs might be subsumed under this type have wider shoulders accompanying the usual flat chest.

4. Dysplastic body forms show stunted growth either of the whole body or parts, i.e., very small nose or minute hands and feet or dysgenital (eunuchoid) features (long extremities, broad pelvis, scanty hair, unusual distribution of fat). The undergrowth of the nose, together with a certain softness of the facial outline, may give the face a pseudo-pyknic appearance, as can also eunuchoid obesity of the trunk. However, this habitus can be easily distinguished from the pyknic type by attention to details. On account of the underdevelopment of the middle part of the face, the line connecting upper forehead, tip of nose and chin may approach a straight line. On the whole this group of individuals with dysplastic features contains all the very marked variations from the most common types.

[22] This term is used here not in a clinical but in a purely morphological sense. Stiller (84) described a "morbus asthenicus" in which he included almost all deviations from the normal constitution. Compare also Zerner (94).

METHODS OF OBSERVATION AND DESCRIPTION

The following observations were recorded for each patient.[23]

1. Fractures
2. Right-handed
3. Head form
4. Face shape
5. Profile: nose
6. Eyes: color, set
7. Ear
8. Hair form
9. Hair color
10. Baldness
11. Neck
12. Larynx
13. Thyroid
14. Trunk outline
15. Fat: deposits: masculine, feminine, infantile
16. Musculature
17. Scapulae
18. Hair amount: scalp, eye-brows, chin, cheeks, trunk, arms, legs, pubes, axilla
19. Hair texture
20. Skin: color, texture, moisture
21. Moles
22. Freckles
23. Wrists and ankles
24. Foot arch
25. Fingers: pointed or blunt
26. Nails: lunuli, curvature
27. Testes: sexual anomalies

In order to avoid the usual descriptive terminology which does not lend itself readily to later analysis, comparison and classification, an attempt was made to make it more simple and accurate. First a system of + and − signs was used to indicate average (+), more than average (++), and excessive (+++), with (+−) less than average and (−) absent. This was more concise than describing the amount of hair and fat in adjectives and was more convenient in the final analysis. Secondly, diagrams were used to obtain a uniformity of detailed observations, with the personal element of the observer reduced as much as possible, and therefore with a greater possibility for the checking up of results by other observers.

The following diagrams were used. The schematic facial outline types are those of Kretschmer (fig. 3). The trunk outlines are adapted from photographs of patients, illustrating recurring conditions (fig. 4). The outlines of face and head are recorded similarly after observation of a number of individuals with a selection of only the most elementary differences in alignment of features (fig. 5, rear profile and top of head from above; fig. 6, forehead, lips and chin). Figure 7 shows diagrams of hands. Diagrams were also used to aid in recording observations

[23] A complete medical physical examination was done on each patient

regarding hair form, nose, shoulder blades and ear shape. The diagram for hair form was taken from Sullivan (86) after Martin. The diagrams for nose and ear shape were adapted directly from Martin (56).

In about one-third of the cases photographs were taken showing front view of head and chest, profile of head and chest, and trunk in one or two views. These were numbered and the morphological types recorded independently from the other observations.[24] These diagnoses agreed with the classification made from observation of the patients.

BODY TYPES FROM OBSERVATION

Our material is too small to yield any conclusive results as to the frequency of occurrence of physical types. Moreover, the percentages of these types in the general population are not sufficiently known. However, since it is a true random sample which contains representatives of the different type groups, a survey of the percentages is not without interest.

Percentages of types in 65 cases

	per cent
13 pyknics	20.0
7 asthenics	10.8
9 athletics	13.8
18 pyknoid	27.7
15 asthenic-athletic mixed forms	23.0
3 unclear	4.6

or

Pyknic forms		20.0
Pyknoid	27.7	69.1
Athletic	13.8	
Asthenic-Athletic	23.0	
Unclear	4.6	
Asthenic		10.8

These percentages cannot claim any special significance. However, it is interesting to know that they may suggest a normal distribution curve of symmetrical character (see later).

These percentages include among the others those cases with dys-

[24] We are indebted to Dr. O. Wuth, Associate in Psychiatry, Johns Hopkins University, for diagnosing these photographs for us according to morphological types independently and without any other knowledge of the material.

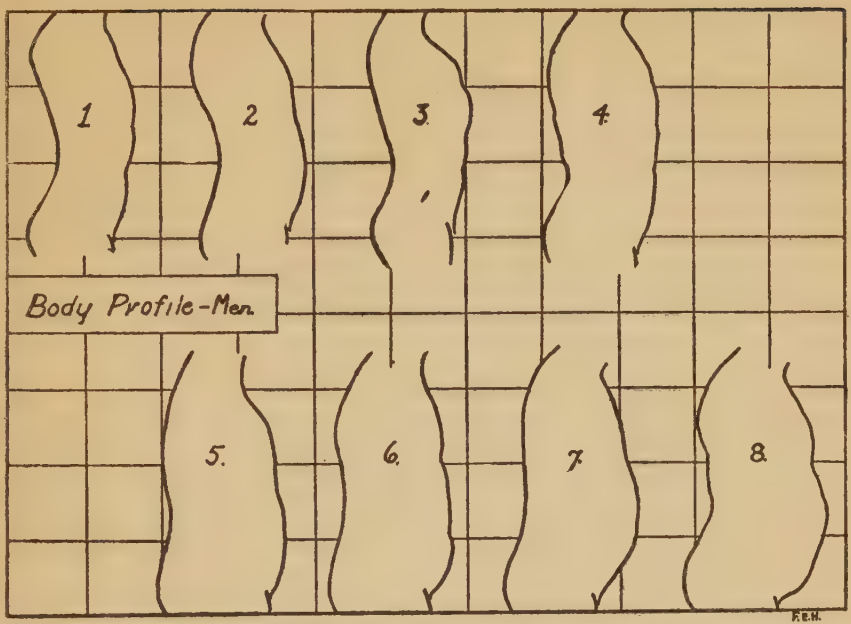

FIG. 4. SCHEMATIC REPRESENTATION OF TRUNK PROFILE

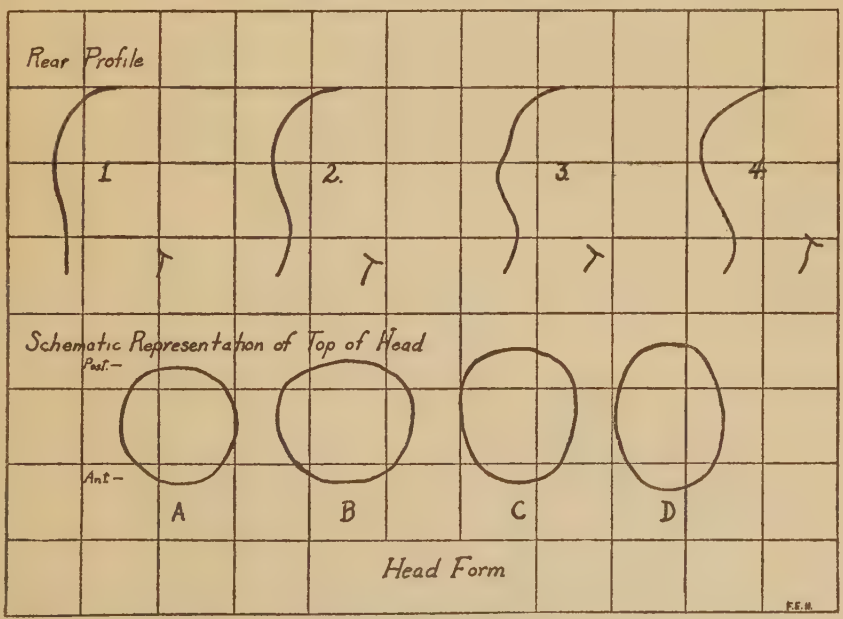

FIG. 5. SCHEMATIC REPRESENTATION OF HEAD FORM (REAR PROFILE AND TOP OF HEAD)

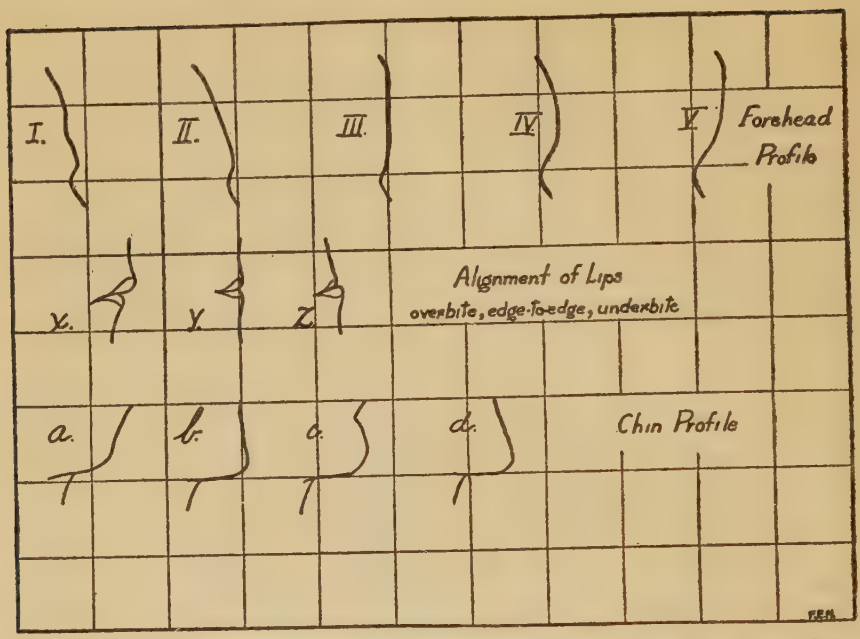

FIG. 6. SCHEMATIC REPRESENTATION OF FOREHEAD, ALIGNMENT OF LIPS AND CHIN PROFILE

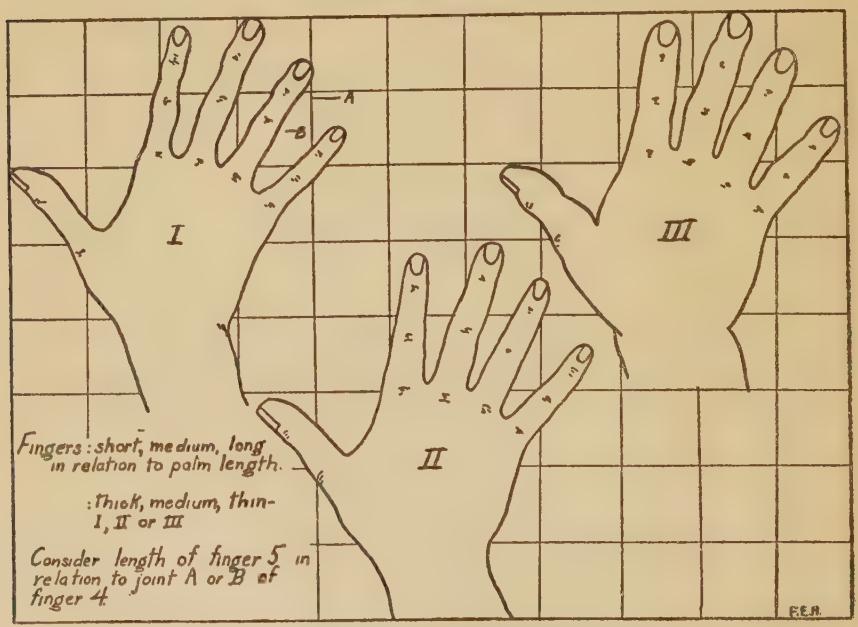
A
B
I
II
III
Fingers: short, medium, long in relation to palm length.
: thick, medium, thin-
I, II or III
Consider length of finger 5 in relation to joint A or B of finger 4.

FIG. 7. SCHEMATIC CLASSIFICATION OF HANDS

plastic features. Cases with dysplastic features can be subsumed under some of the other types too. They were therefore included in the above tables. Twelve of our cases show dysplastic characteristics, in facial outline, distribution of fat and hair or in general proportions. Of these twelve cases, eleven show marked or suggested feminine distribution of pubic hair among other dysplastic features. Only one has normal distribution of pubic hair (no. 20). His dysplastic features consist mainly of marked disproportion of limb length and stature. The main other findings in his case were: mydriasis; eyebrows a little scanty lateralward; small mouth; palate narrow; large hands and long fingers; cyanotic hands and sweaty palms; narrow costal angle; liver dullness not quite two finger breadths below costal margin in right mammary line; gonads normal in size; hypotrichosis of arms and legs, especially thighs; eye grounds: very large physiological cupping; discs of good color; lymphocytosis 43 per cent (Dr. Thomas P. Sprunt).

With the exception of one case in the pyknic group (no. 41) and one case in the pyknoid group (no. 58) all of these dysplastic features occur in cases of asthenic, athletic, or asthenic-athletic mixed forms. None of them occur in the three unclear cases. Dividing cases into pyknic, athletic, asthenic, and dysplastic groups, as Kretschmer does, involves the use of two different principles of classification. This is of importance because a separate correlation of the dysplastic group with psychiatric diagnoses is carried out. The percentage of dysplastic cases was 18%.

ANTHROPOMETRIC METHODS

The third series of independent data consists of anthropometric measurements. Fifty-three of these measurements were taken on each patient according to the technique described by Martin (55) (56) and Hrdlička (34).[25]

The following table gives the list of absolute measurements taken:[26]

1. Weight (kilograms)
2. Span
3. Stature
4. Xiphoid height

[25] The absolute measurements were taken in the clinical laboratory of the Henry Phipps Psychiatric Clinic with a set of instruments devised by the late Professor Martin of Munich. In connection with these measurements a series of physiological tests was done by Dr. R. S. Lyman which is being worked out independently.

[26] The anatomical terminology is given in preference to the anthropological one, which uses terms such as symphysion, nasion, etc., which are not so familiar to the medical reader.

5. Symphysis height
6. Anterior iliac spine height
7. Tibiale height
8. Femur height
9. Malleolus height
10. Sitting height
11. Trunk height
12. Horizontal head circumference
13. Horizontal chest circumference: maximum inspiration, rest, maximum expiration
14. Greatest arm circumference
15. Smallest arm circumference
16. Greatest thigh circumference
17. Greatest calf circumference
18. Smallest leg circumference
19. Chest length
20. Subcostal angle
21. Bi-acromial diameter
22. Bi-iliac diameter
23. Greatest hip diameter
24. Transverse chest diameter
25. Sagittal chest diameter
26. Arm length
27. Humerus length
28. Radius length
29. Hand length
30. Hand breadth
31. Palm length
32. Finger length
33. Nail length
34. Nail breadth
35. Maximum head length
36. Maximum head breadth
37. Bizygomatic diameter
38. Bigonial diameter
39. Head height
40. Total face height
41. Upper face height
42. Nasal height
43. Nasal breadth
44. Ear length
45. Ear breadth
46. Ascending ramus length
47. Horizontal ramus length
48. Mandible length
49. Gonial angle
50. Interpupillary space
51. Interocular breadth
52. Palpebral length
53. Palpebral breadth

Thirty-seven different indices were calculated and analyzed in order to find out whether inductively, from a statistical evaluation of anthropometric measurements alone, a grouping of outstanding body types would emerge. These indices are given by Martin (55). The procedure in using absolute measurements and indices was made in two ways. First, frequency distribution curves[27] were plotted for both absolute and proportional measurements. Although the number of cases was too small to expect conclusive results from a frequency distribution, at least an indication of a trimodal frequency distribution might have been expected if the pyknic, athletic and asthenic types were sufficiently distinct. Or further there existed the possibility that if the pyknic and non-pyknic body forms were antagonistic types,

[27] A normal frequency distribution curve, that is to say a curve of chance, is a symmetrical one in which the mode, i.e., the highest point in the curve, and the mean, i.e., the arithmetic average, occur on the same ordinate. A socalled bimodal curve is one which has two peaks and, when representing a sufficiently large sample of data, may represent the occurrence of two separate elements in the data considered (see fig. 8). Similarly the trimodal curve has three distinct peaks and may indicate three types or elements.

a bimodal frequency distribution curve (cf. fig. 8) might reveal a suggestion as to the distribution of these two types. No indication of bimodal or trimodal frequency distribution was obtained.

Secondly, the measurements obtained were compared with the averages and ranges of variation for the pyknic, asthenic and athletic types as given by Henckel (30) (31). An analysis was made of the measurements and indices of each patient of the group of this study in comparison with the figures given by Henckel as the average, highest and lowest values for each type, as found in his group of cases.

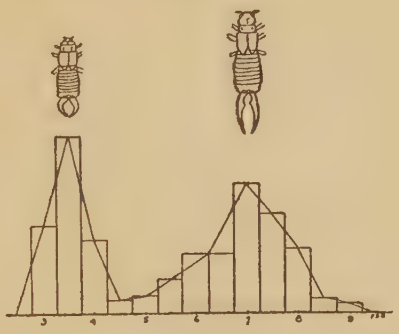

FIG. 8. BIMODAL POLYGON ILLUSTRATING DIFFERENTIATION OF TWO SPECIES PLOTTED FROM DATA ON EARWIG
(From Bateson and Johannsen)

This study yielded two negative results. First, on the basis of the measurements used by Henckel, it was not possible to assign the individual cases definitely to one or another of the type groups; secondly, no absolute measurements or indices were indicated as selectively significant in assigning cases in respect to body type, with the exception of the Pignet Index (to be discussed later).

The following is the list of indices which were calculated:

1. Weight—stature
2. Stature—span
3. Sitting height—stature
4. Trunk height—stature
5. Trunk height—span
6. Anterior-posterior diameter—lateral diameter chest
7. Anterior-posterior diameter—chest length
8. Lateral diameter—chest length

9. Chest circumference—chest length
10. Chest circumference—stature
11. Bi-acromial diameter—trunk height
12. Bi-iliac diameter—biacromial diameter
13. Bi-iliac diameter—trunk height
14. Arm length—leg length
15. Arm length—trunk height
16. Humerus length—femur length
17. Tibial length—femur length
18. Trunk height—leg length
19. Radius length—humerus length
20. Finger length—palm length
21. Hand length—radius length
22. Hand breadth—hand length
23. Nail breadth—nail length
24. Leg length—thigh length
25. Cephalic breadth—cephalic length
26. Cephalic height—cephalic length
27. Total face height—bizygomatic diameter
28. Upper face height—bizygomatic diameter
29. Interpupillary space—bizygomatic diameter
30. Nasal breadth—nasal length
31. Ear breadth—ear length
32. Cephalic height—cephalic breadth
33. Arm length in per cent stature
34. Leg length in per cent stature
35. Korperfülle Index (Rohrer)
36. Pignet Index
37. Morphologic Index

METHOD OF CORRELATING OBSERVATION TYPES WITH ONE INDEX; "CONSTITUTIONAL INDICES;" WEIGHT

The conclusion was therefore reached that these body types could probably not yet be found inductively by anthropometric methods or expressed accurately in anthropometric terms of body proportions. This does not mean that anthropometric methods themselves are not applicable for the distinction of these types, for as in racial anthropology the observation types can be used as a starting point and then correlated with anthropometric measurements. Absolute measurements, such as Kretschmer used in his book, are the least conclusive for such a procedure, for slight differences in absolute measurements may be found in any two groups of individuals, whether they be admissions to a hospital or admissions to a club. In considering the

possibility of an index, therefore, which would define the physical habitus of an individual, it is necessary to keep in mind the fact that such a so-called constitutional index should represent the characteristic morphology of the individual as a whole, as contrasted with such indices as the cephalic index, which states the proportion between two measurements of only one part of the body.

As de Giovanni has already pointed out, the impression of the existence of morphological types is dependent on the different size of the body cavities and their relation to the limb length. Naccarati's morphological index is evidently aimed at just this proportional relationship (62). This index, however, is not suitable for psychiatric patients and its accuracy in other constitutional studies may be questioned since in the one index is involved the use of ten different measurements. The fact that two of these measurements may be influenced by subcutaneous fat, variable in most mental patients, increases the opportunity for error. Slight errors may be much magnified in the final result, since nine measurements must be multiplied before being subsequently added. A theoretical criticism of this index might also be raised on account of its form, the mathematical propriety of dividing the product of three measurements by the sum of two others being open to question. More explicit information as to the technique of taking the measurements for this index would be necessary. Measuring a diameter "at the level of the fourth rib" without further instructions becomes difficult when it is considered that the fourth rib curves in three dimensions, and varies in position during breathing.[28]

The variations in weight during psychoses rule out for exact evaluation of the physical constitution of psychiatric patients three other indices which have been used as an index of the physical constitution, namely:

[28] This index has been used by Dr. F. Shaw (80) in a recent study. His data are not significant since no figures regarding the range of variations are given. Aside from this fact, the significance he attaches to the bimodal curve obtained from a frequency distribution of his index values may be questioned. The difference between the two peaks of this curve (which he interprets as definite evidence of the existence of two body types) is numerically one hundred points. Naccarati (62) states that "an error of one-half centimeter plus or minus would cause a change of fifty counts in the index" (p. 21).

1. The Becher-Lenhoff Index: (Martin (55), p. 27 $\frac{\text{Length of anterior trunk wall}}{\text{Waist circumference}} \times 100$

2. The height-weight index of build (Buffon, Rohrer, Bardeen (4): $\frac{\text{Weight}}{\text{Stature}^3}$

3. The Pignet Index (68): Stature (cm.) $-$ [(chest circumference (cm.) $+$ weight (kgm.)]

The Becher-Lenhoff Index contains as one of its components the waist circumference which is dependent on the state of nutrition of the individual. The Rohrer Index and the Pignet Index contain weight itself. Of these two the Pignet Index requires particular attention since it has been quoted by Kretschmer as an anthropometric confirmation of his findings. Kretschmer also reproduces the table obtained by Henckel (Kehrer and Kretschmer (39), p. 179). Three objections can be raised against the Pignet Index as an accurate anthropometric method for the study of the morphological constitution. First it compares a linear with a non-linear measurement (weight); secondly, its accuracy is not beyond doubt since one centimeter is regarded as equivalent to 1 kgm. of body weight. A variation of 1 cm. in chest circumference can easily occur in two successive examinations. More important than these two is the weight factor. Weight, which is a component of the index, changes considerably in the course of many psychoses so that evidently the index gives different values at different stages of the disease. The weight of both manic-depressive and schizophrenic patients tends to be influenced very much during the course of the psychosis. In Henckel's study (30) (31) this error is considerably increased by the fact that while his schizophrenic patients were examined during their stay in the hospital (i.e., during the psychosis) a large number of his manic-depressive patients were examined after recovery when the patients were asked to return to the dispensary. Thus the evaluation of the Pignet Index in manic-depressive cases was influenced by the fact that the majority of the patients with manic-depressive psychoses as a rule gain weight in the course of recovery, and some in fact to a very considerable degree and with great regularity. Kolle has clearly recognized this error without, however, finding a means of evading it (Kolle (41)). He substituted the weight on admission for the weight taken at the time of examination. This method neglects the fact that the period of illness before

the patient seeks admission to the hospital varies of course greatly in different patients and they may, and often do, lose a considerable amount of weight at that time. Figure 11 illustrates the possible variations of weight during the course of recovery. The patient (no. 10) gained 74 pounds (or 33.8 kgm.) from the date of his admission on June 30 to March 15. His best weight was slightly more than 250 pounds about two years before admission. This patient was from observation a clear pyknic type, not very conspicuously fat; he was a well-built actor.

Henckel assumed that the following averages and ranges of variation of Pignet Index values correspond with the morphological types in mental patients.

	AVERAGE	RANGE OF VARIATION
Asthenic	+34.3	(23.0– 54.2)
Athletic	+11.9	(10.6– 21.8)
Pyknic	−5.5	(−34.8–+12.2)

Three examples may be sufficient to show the inaccuracy of this method.

1. Patient no. 15. Weight on December 22, 45.9 kgm. His Pignet Index was 33.7. According to Henckel's figures this should signify an asthenic constitution. During the course of recovery from his depression he gained weight and reached by May 12 the weight of 60.0 kgm. This influences the Pignet Index to the value of 19.6, which according to Henckel would signify an athletic constitution (see fig. 9).

2. Patient no. 6. Weight on March 4, 59.0 kgm. His Pignet Index was +18.7. This figure would place him, according to Henckel's figures, in the athletic type group. By April 17 he had gained during the course of recovery from his depression to the extent of weighing 68.0 kgm. His Pignet Index calculated for April 17 was therefore +9.7. In other words, according to Henckel, he had changed from the athletic type to the pyknic type, merely by gaining weight (see fig. 10).

3. Patient no. 10. Weight on June 20, 78.2 kgm. His Pignet Index was −2.9. He gained weight very regularly so that by March 27 his weight was 112 kgm. His Pignet Index therefore had changed from −2.9 to −36.7, that is to say to a value beyond the range of variations given by Henckel for the Pignet Index. He remains still of the pyknic type, although the

index values changed so enormously, because beyond the pyknic Henckel has no other type (fig. 11).

If we assume a patient with stature 164.9 cm., chest circumference 87.0 cm., weight 66.0 kgm., the Pignet Index would be 11.9, i.e., the

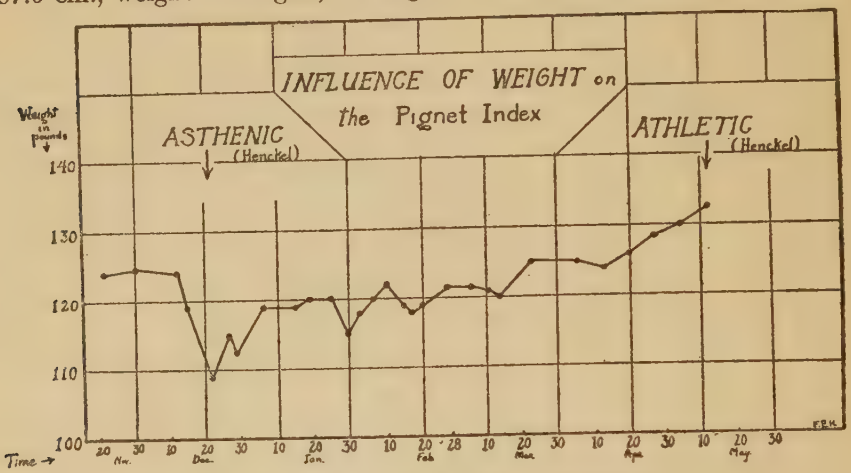

Fig. 9. Influence of Weight on the Pignet Index I

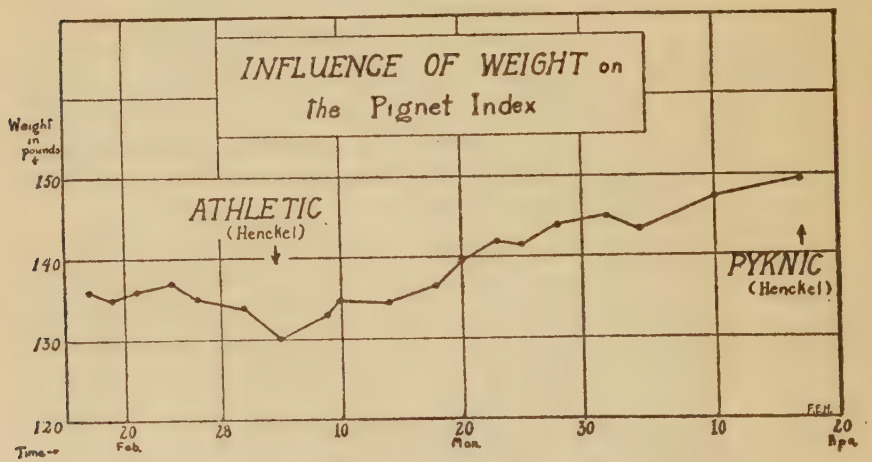

Fig. 10. Influence of Weight on the Pignet Index II

average value for the athletic type according to Henckel. If this patient gains 17.4 kgm., a possible change of weight in the course of a psychosis, his Pignet Index will become −5.5, or average pyknic.

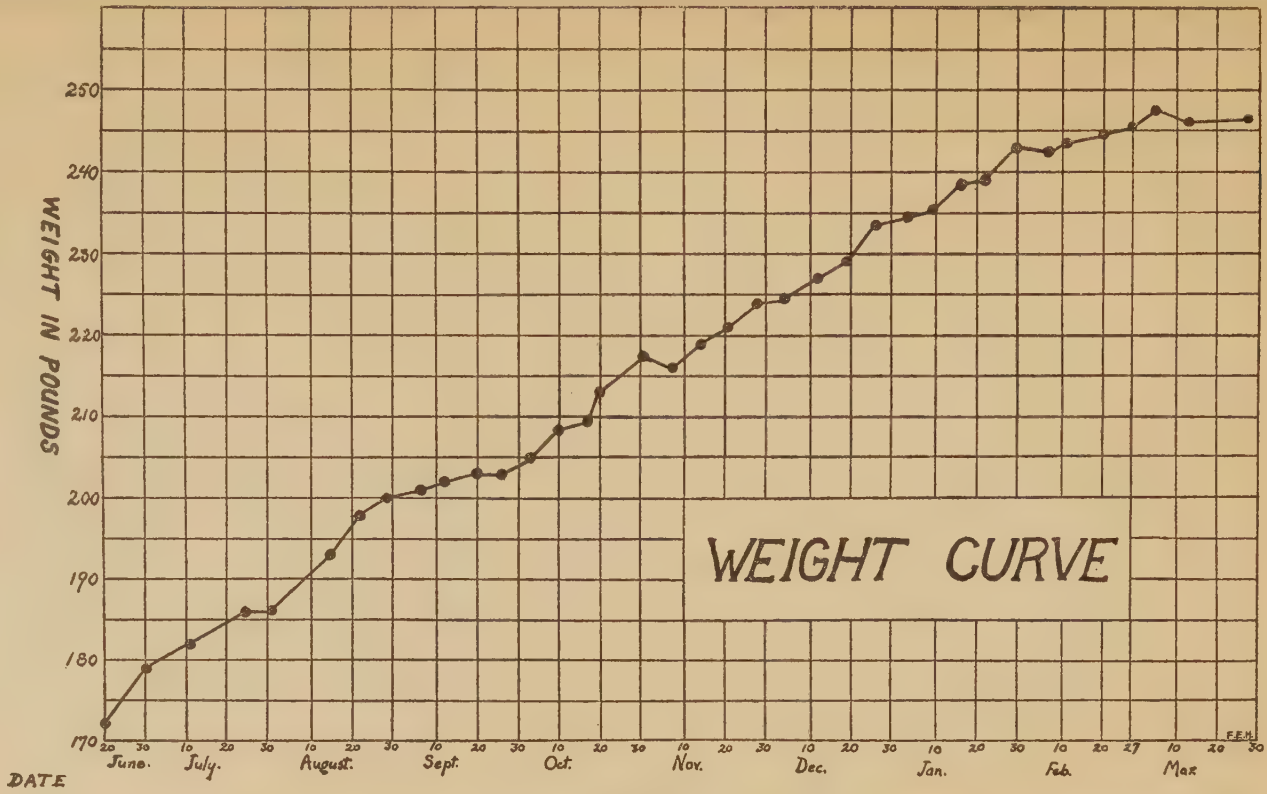

FIG. 11. WEIGHT CURVE ILLUSTRATING REGULAR INCREASE OF WEIGHT IN PATIENT RECOVERING FROM A FOURTH ATTACK OF DEPRESSION

Influence of weight on Pignet Index III

If on the other hand this same patient loses 22.4 kgm., his Pignet Index becomes 34.3 or (according to Henckel) reaches the average value for the asthenic type. Such considerable changes of weight are not at all infrequent in mental disease. However, very much smaller weight changes influence the Pignet Index values to such an extent that (according to Henckel's figures) an individual would be transposed from the boundary of one group to that of another, even though he might not reach the average value for that group.

It seems evident therefore that anthropometric indices which contain weight as a component are not very suitable for exact evaluation of the morphological habitus of mental patients, although they may have proved very useful for classifying the degrees of fitness of recruits. Index valuations containing weight can be used only if the weight curve throughout the psychosis from the onset, not only from admission to the hospital, is recorded.

If attention is drawn here to the fact that weight is a source of error in so-called constitutional indices, it is not implied that weight itself may not be of importance as a constitutional sign. In fact changes of weight are probably one of the most important constitutionally determined physiological reactions. It is a common medical experience that certain people are constitutionally apt to gain weight under conditions when other people do not. In mental diseases it is sometimes striking how psychopathological reactions which in many ways are similar show different weight curves during the psychosis. Kraepelin reproduces in his text book ((47), p. 1229) two curves of manic patients—one regular, one very irregular. He assumes for the explanation of the irregular weight curve that the manic attack was composed of many small attacks. Figures 12 and 13 show the weight curves of two patients with predominantly manic excitement from which both recovered completely. The first curve is fairly regular, the second very irregular. The first patient suffered from a manic excitement with religious grandiose delusions and an episode with auditory hallucination. The second patient suffered from a manic excitement complicated by dysmnesic and certain schizophrenic-like reactions. His sister suffered from a recurrent stuporous reaction with a normal interval of about ten years. The first patient was of pyknoid habitus. The second was of athletic habitus. It is possible that the

differences in the weight curve of different mental patients are at least related to the morphological constitution in general. The physiology of the loss and gain of weight in mental diseases is not yet at all clear.

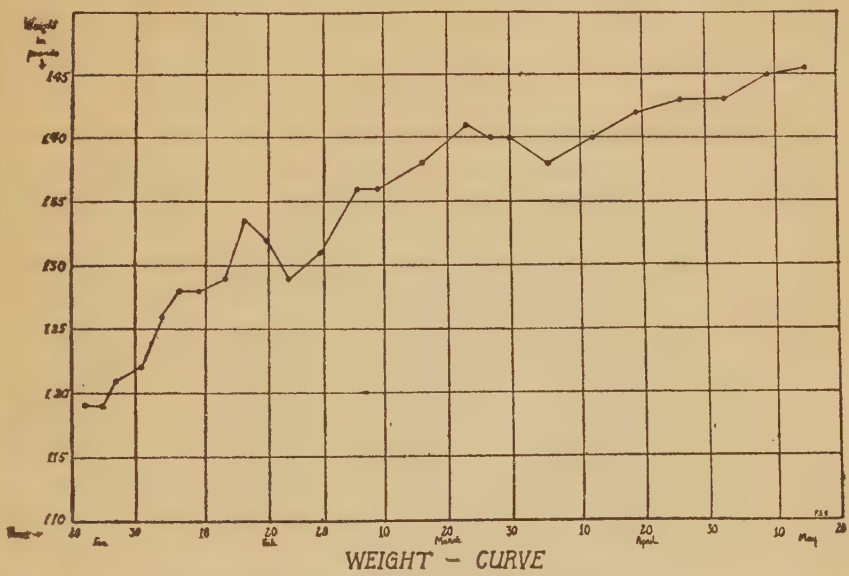

FIG. 12. REGULAR WEIGHT CURVE DURING MANIC ATTACK

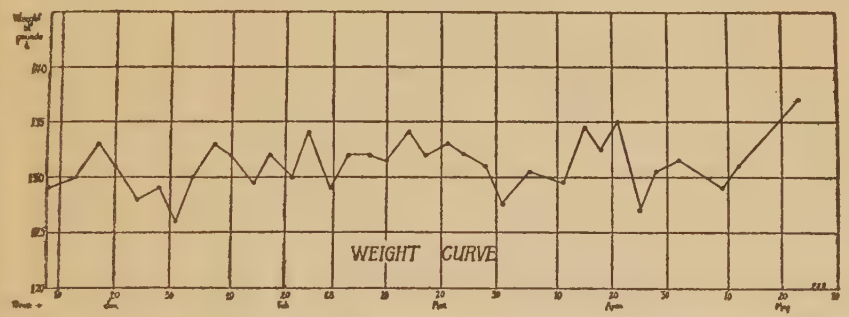

FIG. 13. IRREGULAR WEIGHT CURVE DURING MANIC ATTACK

From our observation it seems possible to make three factors responsible for weight changes: first, the variation in the actual intake of food; secondly, the often-called endogenic disturbances of metabolism, which according to Reichardt (72) are probably due to a dis-

order of the central nervous system; thirdly, a constitutional factor which may be correlated in some way with the morphological constitution. In different psychoses these three factors are involved in varying degrees. Reichardt (72) has observed greater endogenic weight changes in schizophrenia than in manic-depressive psychoses (p. 339). An old observation by Nasse (quoted by Rosenfeld (64)) is of interest in this connection. He found that patients who had suffered from previous psychotic attacks tended to show less change of weight during the psychosis. It seemed to him that a constitutional disposition to mental disease may have a certain connection with only slight changes of body weight. In this form Nasse's remark is probably not correct, as is shown by the weight curve of patient no. 10 (fig. 11), who suffered from his fourth recurrent depression each of which was accompanied by considerable loss of weight. Nevertheless there may be a difference in the weight changes of patients with many recurrences and those with only one attack (according to Pollock (69) more than 50 per cent), on the basis that recurrence of attacks may be regarded as a constitutionally determined sign correlated more frequently than other manic-depressive reactions with a characteristic bodily habitus.

A NEW ANTHROPOMETRIC INDEX; CHARACTERISTIC "TYPES" AT ENDS OF FREQUENCY CURVE

Starting primarily from the morphological conceptions of the Italian school (de Giovanni, Viola) an attempt was made to construct an anthropometric index which would indicate in toto the variations in relationship between trunk cavity and limb length. The greatest difficulty is to obtain measurements indicating the morphological development of the trunk cavity from skeletal points alone and without reference to factors influenced by weight. The skeletal part of the thorax and the trunk height were used as the skeletal substratum of the three-dimensional volume of the trunk. The trunk volume was therefore expressed as the product of three measurements:

1. Transverse chest diameter
2. Sagittal chest diameter
3. Trunk height

In order to obtain the relation to limb length the product of these three measurements was combined with the length of the leg. The measurement of the leg length is an indication of the limb length because the ratio of arm to leg length is one of the most constant of human proportional relationships. The formula of the index is therefore:

$$\text{Index} = \frac{\text{Leg length} \times 10^3}{\text{Transverse chest diameter} \times \text{sagittal chest diameter} \times \text{trunk height}} \times 100$$

All measurements are expressed in centimeters. The leg length is multiplied by 10^3 to bring it from the linear to the cubic dimension and in this way relate it mathematically to the cubic denominator, composed of the product of three linear measurements. The quotient is multiplied by one hundred in order that the result or index may be expressed without decimals. In figure 14 the sixty-five cases are represented in a frequency distribution curve. The abscissa gives the values of the index, each number corresponding to the values from that number to the next higher one; for example in the ordinate column erected over two hundred and forty are all cases with index values from two hundred and forty to two hundred and fifty-five. The individual cases are plotted on the ordinate. The body types are specified in the key. It will be seen that *the values of the index are in definite relation to the body types obtained from observation.* On the left side, where the lowest index values occur, are the pyknic types. At the right side, where the highest index values occur, are the asthenic types. There is no overlapping of asthenic and pyknic types. They are separated by the group of cases with index values ranging from two hundred and fifty-five to two hundred and seventy, in which there are neither pyknics nor asthenics. In the middle are the pyknoid and athletic types, and the asthenic-athletic mixed forms. The pyknoid types tend to the lower, the athletic to the higher, index values. The asthenic-athletic mixed forms tend to higher values of the index than the athletic types. The three cases which were unclear as to classification with regard to body types from the description alone are scattered from the middle to the right side. None of them occur in the pyknic group. Pyknic and non-pyknic forms are clearly differentiated.

The chart indicates *a gradual transition from lower values to higher*

values of the different clear and mixed types represented. This seems to be a significant finding because it is established on anthropometric measurements alone without deduction from general types. The chart

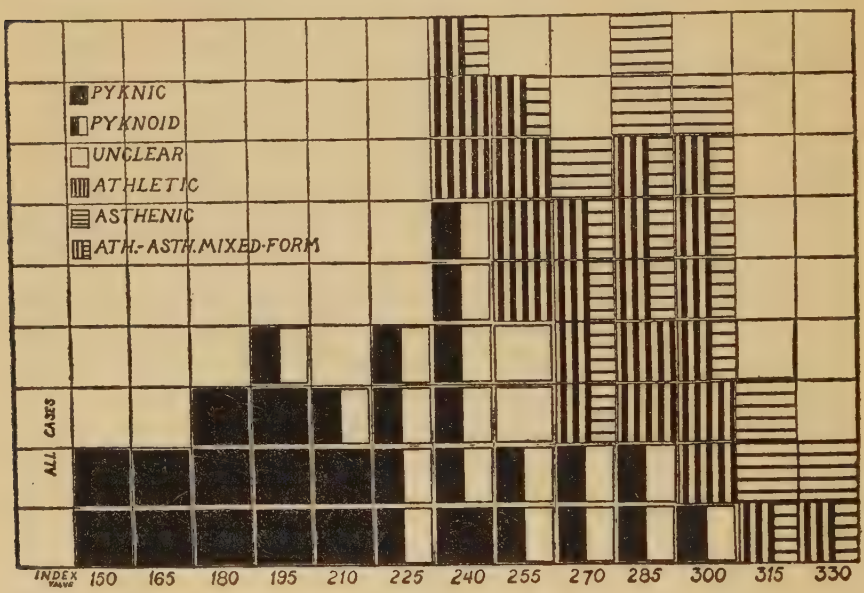

FIG. 14. FREQUENCY DISTRIBUTION OF 65 PATIENTS ACCORDING TO THEIR INDEX VALUES, SHOWING THE CORRESPONDENCE BETWEEN INDEX VALUES AND OBSERVATION TYPES

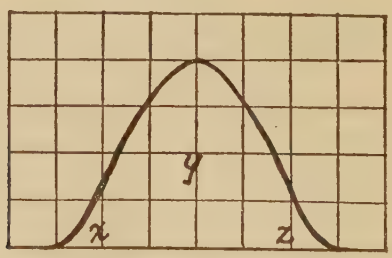

FIG. 15. A NORMAL FREQUENCY CURVE

seems to indicate also that with a sufficiently large number of cases the distribution of body forms would present a normal frequency curve. This distribution would be represented on a curve like that in figure 15. The most clearly differentiated forms would be at X and

Z, the less characteristic forms, intermediate types and gradations in the portion of the curve designated *Y*. This distribution would explain why analysis of varied anthropometric data in search of indications of the existence of out-standing types (indicated by frequency distributions giving bi- or multi-modal frequency distribution curves) proved unsuccessful.

The general distribution according to values of the index seems to coincide in principle with the results of investigations by Viola and also by Bauer, who used the descriptive types of Sigaud. Viola (6) found among four hundred male individuals of Northern Italy much overlapping between the megalosplanchnic and normosplanchnic habitus on the one hand and between the normo- and microsplanchnic on the other (according to his classification). Bauer (6) who recorded the types of Sigaud in two thousand cases at the Vienna Dispensary also found a preponderance of so-called mixed forms. From our material the smaller number of well-defined morphological types in comparison with the others seems well established.

It is possible—even probable—that if a sufficiently large number of cases were collected and classified according to the index, the resulting curve would be asymmetric, or a so-called skew curve, with the peak not in the middle but toward either side. This study is not intended for these anthropological problems, but only for clinical ones, and the material is also too small to allow definite percentage conclusions. Moreover it deals only with a selected group of the population, namely individuals afflicted with mental disease, while the proportions of the general population are not accurately known.

In figure 16 the asthenic, athletic and asthenic-athletic mixed forms are contrasted graphically with the pyknic and pyknoid forms in ogive curves[29] according to their index values. The two curves are entirely separate and do not show any tendency to cross. There is a considerable interval between any two contrasted points along their course. This can be taken as an indication that the material does not

[29] The ogive curve, so-called by Galton who devised it, has been chosen as the graphic method of representing the absolute frequency distribution. According to this method the measurement (in this case the index) is plotted on the ordinate axis, the absolute frequency = order of the individual, along the abscissa. So at equal intervals along the abscissal axis an ordinate is erected for each individual, representing his index value.

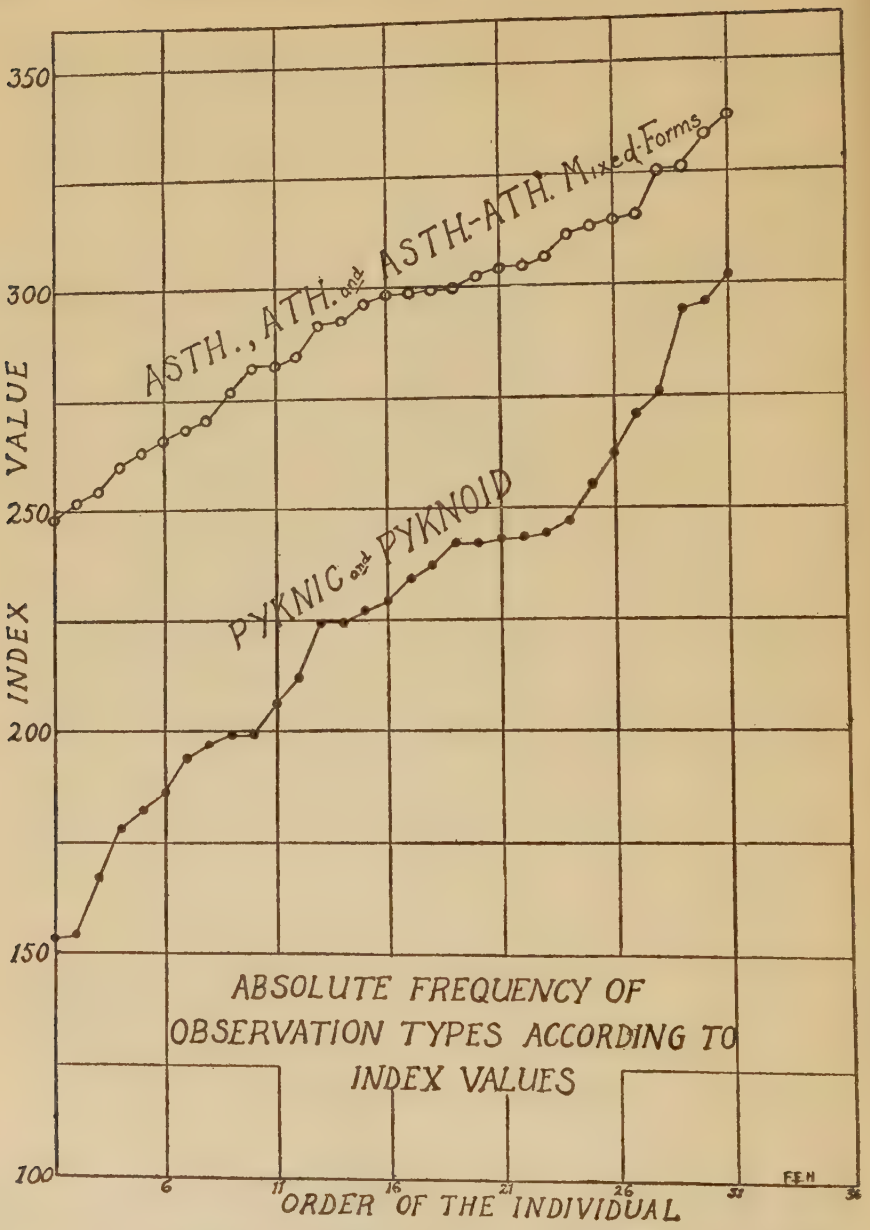

FIG. 16. ABSOLUTE FREQUENCY CURVES OF OBSERVATION TYPES ACCORDING TO INDEX VALUES, ILLUSTRATING THE DIFFERENCE BETWEEN THE PYKNIC AND PYKNOID AND THE ASTHENIC-ATHLETIC FORMS OF BODILY HABITUS

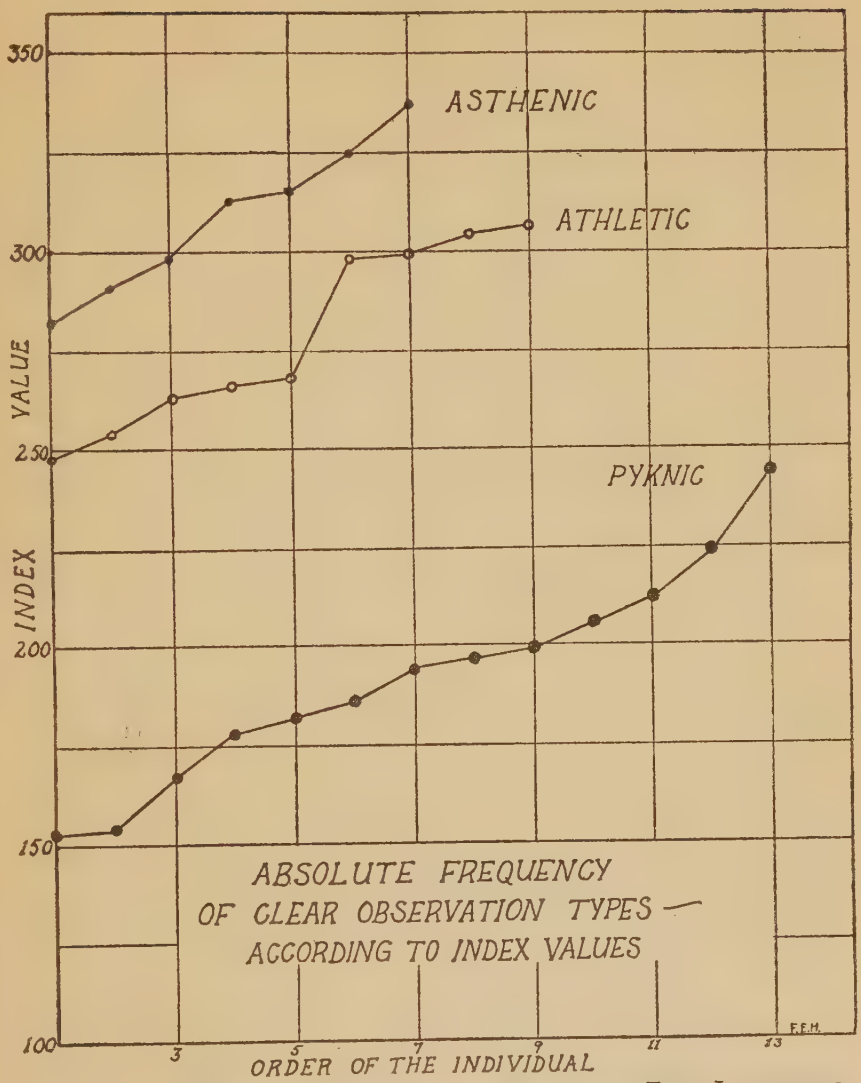

FIG. 17. ABSOLUTE FREQUENCY CURVES OF CLEAR OBSERVATION TYPES ILLUSTRATING DIFFERENCES IN INDEX VALUES BETWEEN THE ASTHENIC, ATHLETIC AND PYKNIC TYPES

represent one homogeneous type, but that on the contrary at least two types are present. If the two ogive curves represented cases of a

homogeneous type a crossing or intermingling of the two curves would be expected.

In figure 17 the absolute frequency of those types which appear from observation as more or less clear is represented according to their index values. The pyknic type forms the lowest curve, the athletic type the middle, and the asthenic the highest curve. This chart indicates that the anthropometric values of the index separate these three types, the distinction between the asthenic and pyknic type being very considerable and beyond doubt. The curve of the athletic type lies between the two, but definitely nearer the asthenic, indicating that with regard to trunk volume and limb proportions the athletic type is nearer the asthenic than the pyknic type. Thus the anthropometric values of the index permit an exact statement which is in conformity with the more general impression received from observation. It is improbable that the distribution on this curve is due to the small number of cases.

The average index value and the range of variation for each morphological group are as follows:

	INDEX	RANGE OF VARIATION
Asthenic	309	(282–337)
Athletic	278	(248–306)
Pyknic	192	(153–244)

The difference between the index values of asthenic and pyknic types is therefore not only great (117), but there is also no overlapping between the extreme members of the group. The highest pyknic index is 244; the lowest asthenic index is 282. The athletic group is in an intermediate position between the other two.

ANALYSIS OF THE VARIOUS COMPONENTS OF THE INDEX

Since the index used contains four different components, each of which may be variable, an analysis of the variation of these components is necessary. The following table gives the average values with the range of variation for each component of the index. The measurements are given in centimeters.

MEASUREMENT	ASTHENIC	ATHLETIC	PYKNIC
Trunk height	49.7(53.1– 62.7)	57.0(52.0–60.8)	58.9(51.7–64.9)
Leg length	85.6(78.3–101.6*)	88.2(75.2–92.2)	85.2(77.5–92.5)
$\frac{\text{Trunk height}}{\text{Leg length}}$ index†	66.7(62.5– 69.2)	64.9(60.1–71.1)	68.9(61.9–79.0)
Transverse chest diameter	25.6(24.3– 28.7)	28.0(26.0–29.8)	31.3(28.7–34.6)
Sagittal chest diameter	19.1(18.1– 20.7)	19.9(17.8–23.5)	24.4(22.0–29.0)

* Case no. 20; see below.

† Since the absolute measurements are much less significant the trunk length expressed in percentage of the leg length is added to the table giving the measurements contained in the index.

It will be seen that the trunk height shows considerable difference. The absolute leg length shows practically no difference between asthenics and pyknics, although under the asthenics is included case no. 20, a case with dysplastic body form, his legs being disproportionately long. The trunk height-leg length index shows a 2 per cent difference between each group. A considerable difference is also present in the chest diameters. It seems of significance that those components of the index which show the most marked differences, namely, trunk height and chest diameter, show an increase in value from asthenic to athletic to pyknic, the athletic being in the middle just as in fig. 17.

AVERAGES OF SOME OTHER ANTHROPOLOGICAL DATA

Our interest being primarily a clinical rather than an anthropological one, we are less concerned with anthropological details. Nevertheless, some other measurements seem to add not insignificant characteristics, and may be of interest for a morphogenetic interpretation of these types. The averages and ranges of variation on page 48 are therefore given.[30]

It will be seen that there is a marked difference between the pyknic and asthenic body types with regard to body surface and to subcostal angle, the athletic type taking an intermediate position in relation to

[30] These figures, based on a relatively small number of cases, can have significance only as indications of the proportions to which the types tend, and cannot be expected to adequately delineate the types.

the measurements of the other two body forms. The head measurements do not show any marked distinction. Measurements of considerable interest because of the relative and absolute proportions they indicate, are those of the bi-iliac and bi-acromial diameters. (The bi-iliac diameter is taken at the outer border of the iliac crests, according to Martin's technique.) The preceding figures show that the absolute measurements of the pyknic are greatest. However, consideration of the relationship between these two measurements in

	ASTHENIC	ATHLETIC	PYKNIC
1. Body surface (in sq. m.)	1.65(1.49–1.97*)	1.71(1.41–1.90)	1.96(1.72–2.29)
2. Subcostal angle (in degrees)	55.0(50.0–60.0)	64.5(50–75)	73.0(55–90)
3. Head circumference (in cm.)	56.4(54.5–58.0)	56.3(54.2–59.0)	57.5(53.4–60.5)
4. Cephalic length-breadth index	76.9(69.9–86.1)	78.6(75.1–85.2)	79.4(77.5–80.9)
5. Cephalic height-length index	68.7(63.4–74.6)	71.1(65.7–78.2)	70.1(65.6–74.9)
6. Cephalic height-breadth index	88.3(81.4–100.0)	90.6(81.2–99.3)	88.5(78.8–93.6)
7. Bi-iliac diameter (in cm.)	28.0(25.1–31.2)	29.1(26.7–34.0)	32.2(28.9–36.5)
8. Bi-acromial diameter (in cm.)	36.2(33.3–39.4)	39.1(35.5–41.9)	39.3(33.9–43.0)
9. Bi-acromial diameter/bi-iliac diameter index	1.31(1.17–1.41)	1.34(1.23–1.41)	1.23(1.07–1.35)

* Case No. 20 (dysplastic). The next figure is 1.69.

each type group shows that the pyknic habitus has least difference between shoulder width and pelvic breadth (considering these measurements as indicators of these two dimensions), while the asthenic comes next, and the athletic has the greatest difference between these two dimensions. It will be recalled that the pyknic type was described as having a barrel-like trunk, largest in the middle dimensions, and returning at the pelvis to proportions comparable with the shoulder breadth. It is also of interest to note that the impression of the broad-shouldered trapezoid-like trunk of the athletic is upheld by these figures. The figures for the asthenic type indicate a more slender type, especially as contrasted with the stocky pyknic form.

Considering the anthropological significance of data concerning

hair and eye color, the fact that analysis of these data in the types of habitus considered here yielded no results in any way significant, is not without interest. Regarding complexion the generalization can be made from our material that as a rule the pyknic type has a fresher and more ruddy color, and a clearer and more smooth skin, than occurs in the other two types.

FACTORS INFLUENCING THE MORPHOLOGICAL HABITUS; THE RACE FACTOR; AGE AND GROWTH; ENVIRONMENTAL INFLUENCES (OCCUPATION)

A number of factors influencing bodily habitus have to be considered. That racial distribution is not a causal factor for these morphological types as has been claimed by Stern-Piper (83)[31] is apparent from our material, which is an example of the racially heterogenous American population. In most cases both maternal and paternal extraction could be obtained. Our patients represent parental extraction of the following character: Scotch, Irish, English, Dutch, French, Norwegian, North German, South German, Welsh, Swedish, Canadian, Portuguese, Russian, Italian, Polish and Czecho-Slovakian. It is possible, in fact very likely, that different races show a different distribution of these body types. Stockard (85) believes that the English people of the upper class show more often the linear type, Germans of the upper class more often the lateral type. Whether they occur among all races is not yet established.

Much more important is the age and growth factor. The original assumption of Sigaud that his morphological types are unchangeable during life had to be given up. Viola believes that the longi- and brachy-types are unchangeable and independent of changes with age. Zweig (95) found that although a definite tendency to the four Sigaud types is already apparent in youth, they are not so unchangeable in the course of life as Sigaud had claimed. Especially the digestive habitus shows progressive increase with age. Bauer (6), p. 1086, also found age displacement of the Sigaud types. Brugsch (11) found that the narrow chested type develops to a normal chested type in one-third of all cases from the age of twenty-five to thirty-five.

[31] Compare also von Rohden (74) who expresses the opposite view.

The normal chested type can develop with advancing age to a wide chested type (pathological emphysema type). Florschütz (21) found in a large statistical material that asthenic individuals do not lose that type, but that with advancing age the type becomes even more apparent. Mills (59) distinguishes dominant types (hypersthenic and asthenic), major types (hypersthenic, sthenic, hyposthenic and asthenic), and six sub-types. According to his observations on over one thousand individuals, bodily changes may lead to a reclassification of an individual with regard to a different sub-type, but no changes occur indicating a reclassification as to major type.

The environmental influences on morphological habitus, which of course become apparent at different ages, are considered in the researches of Verschner on the anthropological characteristics of single-ovum twins (89). According to his findings, which, however, are not final and not in agreement with some other observations, the following characteristics are little affected by environmental influences in the widest sense: stature, length of extremities—absolute and relative to stature, ears, nose, eyes. Much influenced are the following: length, breadth, depth and circumference of trunk, excluding shoulder and thorax breadth, body weight, length, breadth and length-breadth index of skull. The difference between twins does not essentially increase with further years after the end of the age of growth.

In our material the age distribution is as follows:[32]

	AVERAGE	RANGE OF VARIATION
	years	
According to types:		
13 pyknics	45.1	(24–59)
7 asthenics	29.0	(16–52)
9 athletics	28.7	(20–51)
According to diagnosis:		
19 predominantly affective	36.2	(18–65)
25 predominantly schizophrenic	28.6	(18–39)
21 other cases	38.8	(22–56)

The pyknic type is more frequent with advancing age. Bauer found this also for the digestive type of Sigaud. For clinical correlations this is of special importance since manic-depressive psychoses

[32] See also pages 55 and 56.

occur more frequently in middle age. Möllenhoff (60) has pointed out the importance of the age factor for these correlations. He found the asthenic type more frequently among his young patients and the pyknic type more frequently with advancing age.

From the anthropometric analysis the conclusion was also reached that the age factor is very important and that there is a far-reaching age displacement of body types. That age on the other hand should be the only factor responsible seems extremely unlikely. There are cases of definite pyknic habitus with low index at an early age, and of pronounced asthenic habitus with high index at an advanced age. Moreover, as Kretschmer (45) has pointed out, there are details of observation which according to clinical experience change very little with age, for example the form of the hand and head, and the color of the skin.

The ratio of the body length below the symphysis to that above the symphysis shows very marked changes with growth. The line dividing the stature in half in the infant lies considerably above the symphysis. In adult age the length of the upper part of the body (above the symphysis) becomes greater than the height from the symphysis to the floor. According to studies of Fischer and Hoffmann (20) on three hundred and sixty healthy soldiers, this constant predominance of the length of the upper part of the body is reached in one hundred per cent of the individuals by the twenty-ninth year. In our material the exact ratio of the upper to the lower part of the body is variable (when considered in reference to age). At the age of twenty-nine it may be assumed that at least the maximum growth of the thorax is completed. For these reasons separate correlations between index values and psychiatric diagnosis were made with the exclusion of all patients under twenty-nine.

For dysplastic features the age factor is less significant. The pubic hair, for example, according to the painstaking statistical studies of Scheidt (77) shows the full virile growth about the eighteenth year. The distribution type is finally established by the end of the second decade. The average age of patients in the dysplastic group is thirty, the range of variation 16 to 51.

The influence of occupation seems on the whole of little significance for the essential morphological characteristics. With regard to occupation our material is divided according to the old and somewhat

arbitrary classification of Gould, which nevertheless is sufficiently useful:

I. Those who work with the head
II. Those who work mainly with the arms
III. Those who work with arms and legs (sailors)

Our material falls into the following classes:

According to diagnosis

All cases	I	35
	II	27
	III	3
Manic-depressive, I		19 (all)
Schizophrenic	I	9
	II	14
	III	2
Organic	I	2
	II	7
	III	1
Psychopathic personalities and psychoneuroses	I	5
	II	6
	III	0

According to types

13 pyknic	I	5
	II	7
	III	1
9 athletic	I	4
	II	5
	III	0
7 asthenic	I	5
	II	1
	III	1

According to source

	Henry Phipps Psychiatric Clinic	*Spring Grove State Hospital*
Manic-depressive	18	1
Schizophrenic	11	14
Organic	7	3
Psychopathic personalities and psychoneuroses	9	2
	45	20

It would seem that the affective cases belong more to the group of mental workers. This agrees with Stern (82) and Möllenhoff (60), but is in our material partly explained by the fact that the patients come from two sources drawing patients to some extent from different social strata.

CORRELATION OF PSYCHOSES AND PREPSYCHOTIC PERSONALITIES WITH INDEX VALUES AND BODY TYPES FROM OBSERVATION

It is possible then to distinguish from the morphological aspect different groups in this series of sixty-five cases. For clinical correlation we are now in a position to dispense with the body types obtained deductively from the general impression and can substitute the inductive method of comparing the anthropometric values of the index with psychiatric diagnostic groups, without knowledge of what the general type impression from observation would be.

In table 2 all sixty-five cases are represented with a serial number, initials, order in the four diagnostic groups, special psychiatric diagnosis, body type from observation, index value, and incidence of dysplastic features.

It may be assumed from the distribution of the cases according to index values (see fig. 14) that the extreme values of the index may be regarded as characteristic recurring body forms which impress one as morphological body types. If the whole range of index values in the first two psychiatric diagnostic groups is divided into four equal parts, the opportunity is created to determine what psychopathological reactions have an affinity to the index values which are very low (lowest quarter) and those which are very high (the highest quarter). In the range of the lowest quarter of the index values there are only three patients with the following index values: 154, 167, 182. All these three patients belong clearly to the manic-depressive reaction type. The first one (no. 10) was admitted in his fourth depressive attack. The second one (no. 16) was admitted in his second depressive attack. The third patient (no. 6) suffered from a depressive reaction. In the highest quarter of the range of index values there are, leaving out those with dysplastic features, twelve patients. Of these twelve patients seven belong to the schizophrenic reaction type (nos. 25, 39, 21, 43, 35, 22, 23). Two belong to the predominantly affective

group but are specified as showing schizophrenic features during the psychosis (nos. 18 and 19). One case (no. 9) occurs in the affective group but is specified as psychoneurotic depression. Only two cases belong to the manic-depressive reaction type without qualification (nos. 3 and 11). Both are very young. This seems to point to the conclusion that the lowest index values occur more among the manic-depressive reaction types and the higher index values among the schizophrenic individuals. If patients with dysplastic features are included there is added to the lower fourth one patient (no. 41) with the diagnosis schizophrenia and to the upper fourth of the range of index values six patients with dysplastic features (nos. 27, 31, 8, 36, 28), all of whom belong to the schizophrenic reaction type with the exception of one (no. 8) who occurs in the predominantly affective group but is specified as showing schizophrenic-like admixtures.

If the index values are now split into thirds it can be determined what psychopathological reaction types occur in the lower third and which in the upper third, including in both groups individuals showing dysplastic features. In the lower third of index values there are six patients, in the upper third twenty-one patients (including only the first two psychiatric diagnostic groups). Of the group of six patients with low index values, four patients belong to the manic-depressive reaction type (nos. 10, 16, 6, 7). The last patient is in this connection of particular significance. He suffered for seventeen years from a chronic manic condition from which he recovered with good insight. We had the opportunity of seeing this patient during the psychosis, during recovery, and in the normal period after his recovery, and had then occasion to observe him again in his second attack, which was clearly of a manic nature and from which he also recovered completely after about four months.[33] Of the two other patients in the lower third of the index values, one (no. 41) showing dysplastic features, belongs to the schizophrenic reaction type; the other one (no. 24) occurs in the schizophrenic group, but is qualified as an atypical case with anxiety features. It is evident again that among the lower index values the affective psychoses are predominant.

Of the twenty-one patients occurring in the upper third of the index

[33] This case will be presented in more detail in a later study.

values there are fourteen with schizophrenic reaction type (nos. 30, 38, 25, 39, 27, 21, 43, 35, 22, 20, 23, 31, 36, 28). Three cases occur in the predominantly affective group, but are specified as showing schizophrenic features (nos. 18, 8, 19). One case (no. 9) in the affective group presents psychoneurotic symptoms. Only three patients occur in the manic-depressive group without qualification (nos. 17, 3, 11), two of these patients being the two youngest individuals of the manic-depressive group. The predominance of schizophrenic reactions in this group with higher values of the index is apparent. It is also significant that those three cases in the affective group are included from the morphological aspect in the group with higher index values, which from psychiatric diagnostic principles alone had been previously specified as being somewhat atypical in the affective group because they show also schizophrenic-like reactions. It has to be taken into account that the psychiatric diagnoses were put into their final form before the calculation of the index values was completed.

If only the more or less clear manic-depressive and schizophrenic cases are selected the following index averages are obtained.

	AVERAGE INDEX	RANGE OF VARIATION
All clear manic-depressive cases (11 cases)	233.2	(154 –315)
All clear schizophrenic cases (23 cases)	280.7	(178*–337)

* Patient no. 41 with dysplastic features; the next higher index value is 229.

Since, however, the age factor as we have seen is of importance and since the manic-depressive patients usually have a considerably higher average age than the schizophrenic patients this has to be taken into account for the psychiatric correlations.

	AVERAGE AGE	RANGE OF VARIATION
	years	
Clear manic-depressive cases	39.3	(18–65)
Clear schizophrenic cases	28.7	(16–39)

If only those cases above and including twenty-nine years are selected (see discussion on pages 50 and 51) the following index averages are obtained.

	AVERAGE INDEX	RANGE OF VARIATION
Clear manic-depressive cases (6 cases)	199.1	(154 –262)
Clear schizophrenic cases (12 cases)	260.3	(178*–315)

* Patient no. 41 with dysplastic features; the next higher index is 229.

Correlation of all clear manic-depressive and schizophrenic diagnoses with morphological types from observation (including patients with dysplastic features) gives the following percentages:

In clear manic-depressive cases, all ages

	per cent	
Pyknic	45.5	
Pyknoid	36.4	
Asthenic	0	
Athletic	9.0	
Unclear	9.0	

In clear schizophrenic cases, all ages

Pyknic	4.3	
Pyknoid	13.0	
Asthenic	17.4	78.3
Athletic	26.1	78.3
Asthenic-athletic mixed	34.8	78.3
Unclear	4.3	

In clear manic-depressive cases 29 years and over

Pyknic	66.6
Pyknoid	33.3
Asthenic	0
Athletic	0

In clear schizophrenic cases 29 years and over

Pyknic	8.3	
Pyknoid	25.0	
Asthenic	16.7	58.4
Athletic	16.7	58.4
Asthenic-athletic mixed	25.0	58.4
Unclear	8.3	

The different diagnostic groups are too small to allow a differentiation according to special types of schizophrenic or affective reaction. However, from the schizophrenic group may be selected all those cases with catatonic phases. Three patients in this group show catatonic

symptoms (patients nos. 22, 23, 27). All three have indices in the upper fourth of the range of index values (indices 306, 314, 298). Two patients in the schizophrenic group show simple deterioration (nos. 28 and 43). Their index values are above 300 (302, 337). Individual correlations of each case may be seen on table 2.

Independent of Kretschmer's researches, Beringer and Düser (8) showed the frequent incidence of eunuchoid and feministic morphological traits in schizophrenic patients. Gibbs (23) found feminine distribution of pubic hair in 13 per cent of schizophrenic patients admitted between sixteen and twenty, which was still present in 13.4 per cent after they were twenty-one or over; but this characteristic was present in only 2.6 per cent of those patients admitted between twenty-one and forty.

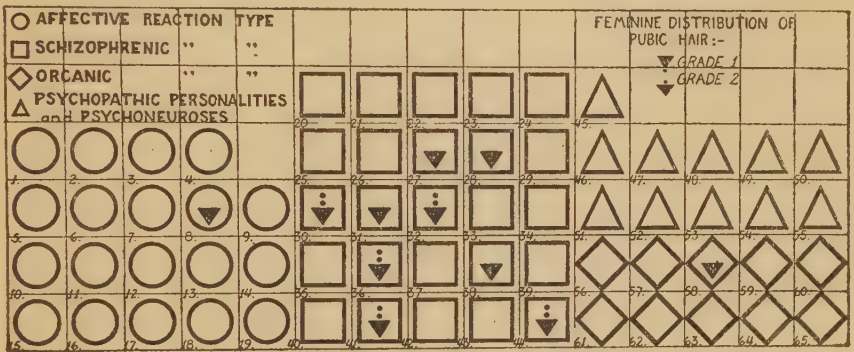

Fig. 18. Incidence of Dysplastic Features in the Different Diagnostic Groups Illustrated by the Occurrence of Feminine Type of Crines among 65 Patients

Twelve patients of the group of sixty-five considered in this study have dysplastic features. Eleven of these showed among other dysplastic characteristics, feminine distribution of pubic hair. Figure 18 shows the relation of the dysplastic group of patients to the psychiatric diagnoses of all sixty-five cases. It will be seen that in the first group, consisting of predominantly affective reaction types, there is only one case with feminine distribution of pubic hair (case no. 8). This patient suffered from a psychosis which was diagnosed as predominantly manic-depressive with the schizophrenic features specified on table 2. In the second group, consisting of predominantly schizo-

phrenic patients, are nine cases with dysplastic pubic hair. These nine cases are scattered irregularly throughout the group. Among the psychopathic personalities and psychoneuroses there is no dysplastic case. One such patient occurs in the organic reaction type group. This patient (no. 58) was a case of dementia paralytica with the somewhat unusual feature that four years before admission to the hospital he suffered from an ill-defined depressive episode. The twelfth patient of the group with dysplastic features, but with masculine crines, also suffered from a schizophrenic psychosis (no. 20). The affinity of the schizophrenic reaction type to this dysplastic group is therefore evident. No conclusions as regards endocrinological factors in schizophrenic reactions can be drawn from this finding, because deficiencies of hair are found not infrequently in the general population. However, the contrast in this respect between the schizophrenic and the manic-depressive groups is striking.

The percentage of the incidence of body types in the general population is not accurately known. While the types of Viola, Sigaud, and Kretschmer, and our group with high and low index values, have a certain similarity, no definite conclusions can be drawn with regard to the incidence of types in the general population from studies which have been done according to only one of these classifications (like that of Viola, see p. 43). For this reason the emphasis of this study had to be necessarily on the contrast between the two psychiatric diagnostic groups—the manic-depressive and the schizophrenic. Apart from the relatively small number of cases in this material, a comparison of the percentages obtained by other authors following Kretschmer (see Kehrer and Kretschmer (39) table on p. 174) is not carried out because these percentages based on the observation of types do not sufficiently take into account the displacement of body types due to age. They all contrast schizophrenic with manic-depressive patients, and it may be inferred that the manic-depressive group shows a higher average age than the schizophrenic cases, if unselected cases are taken. While from this study it seems apparent that, even apart from the age factor, the pyknic and pyknoid forms occur more in manic-depressive patients than in schizophrenic cases, and the athletic, asthenic and dysplastic forms occur more frequently among schizophrenic patients as compared with manic-depressive

reaction types, yet it does not seem possible as yet to state exactly how far the age factor is of influence. For example, Kretschmer (45) quotes the statement of von Rohden that in nine hundred and thirty-seven manic-depressive cases of various observers who used his (Kretschmer's) method, the percentage of pyknic body forms is 66 per cent. In our group of clear manic-depressive cases, the percentage of typical pyknic body forms is only 45.5 per cent. If, however, from this group of more or less clear manic-depressive psychoses, the cases with ages under thirty years are taken out, the percentage of pyknic body types rises to 66.6 per cent (see pages 50 and 55). All the percentages of body types in psychoses, based on observation, have therefore to be taken with the greatest caution on account of the age factor. Correlations should start from exact percentages of body types in the general population. Since this is not possible as yet, two psychotic groups are contrasted which unavoidably, at least as far as patients observed in psychiatric clinics are concerned, are of different age. Kretschmer has not done justice to the importance of the influence of age. He (39) gives three tables in which his schizophrenic and manic-depressive patients are classified in age groups, but they refer only to chest circumference, Pignet Index, and relation of stature to weight. The age factor, therefore, seems at present one of the most urgent problems of investigation with regard to the morphological constitution in psychiatry.

An attempt was made to make independent correlations between morphological type and prepsychotic personality. Popular belief associates broad and slender body-types with all sorts of mental characteristics and habits. Slender people are supposed to be more often cigarette-smokers, broad people more often cigar-smokers. Lovers of alcohol are supposed to be more broad, abstemious people more slender.[34] Broad people are often regarded as more materialistic and sensuous, slender ones as more idealistic and mystical. There

[34] Cf. the epigram by J. B. Rousseau (1670–1741):

Toujours ces sages hagards,
Maigres, hideux et blafards,
Sont souillés de quelque opprobre;
Et du premier des Césars
L'assassin fut homme sobre.

are many examples in folk-lore of similar beliefs. That criminals and "bad men" are characterized by certain physical qualities and are often of dysharmonious growth, was a very widespread popular belief until the advent of the modern moving picture era. Homer depicted Thersites with a generally deformed body and misshapen head. Deficiencies in hair growth are also associated with mental characteristics in popular belief, as shown for example in the French proverb: "Salute from afar the beardless man and the bearded woman."

It is not intended here to discuss in detail the many attempts that have been made to distinguish personality types. None of these attempts have been entirely successful. They are all based on simplifications which do not do justice to the complicated dynamic interplay between the personality and the social setting. From the findings of experimental psychology the human personality as a living entity does not emerge. With the "psychodiagnostic test" of Rorschach constitutional differences between individuals can be found, similar to though not identical with the introverted and extraverted types as distinguished by Jung. Kretschmer has used the distinction of "schizoid" and "cycloid" personalities. The concept of "schizoid" personality originated from the observation of three classes of individuals: first, the pre-psychotic personality of individuals later suffering from schizophrenic psychoses; secondly, the type of to-some-degree distinctive personalities sometimes found in the ancestry of schizophrenic patients; thirdly, a type of psychopathic personality with habitual psychopathological reactions similar to some extent to certain manifestations of the schizophrenic reaction type. The concept of "cycloid" personality has a similar origin. In this way personality types are postulated in relation to clinical entities. The danger of this procedure lies in the fact that these two very expanded groups are found again and again, because nothing else is looked for (Kahn, (38), p. 48). In the form given to them by Kretschmer they do not constitute a new point of view, but rather the latest ramification of the Kraepelinian system of clinical disease entities. The evidently secondary psychological presentation of these two types is based on two not unitary principles called by Kretschmer the "diathetic" and "psychaesthetic" proportions. There is a great variety of individuals classified under those two types, which makes it doubtful whether one

can speak of them as personality "types." Certain individuals described as schizoid personalities can be designated from a clinical point of view with the same justification, and from a therapeutic point of view more profitably, as psychoneuroses. It seems that the indiscriminate use of the term "schizoid" may do a great deal of harm. This term has the double meaning of being in fact closely related to schizophrenia, as in Kahn's theory of the mode of hereditary transmission of schizophrenia and of being in some way psychologically similar to it, as in Bleuler's distinction of schizoid and syntonic.[35]

In everyday life personalities are judged usually by the affective attitude toward the environment, especially other individuals and the social group. It seems that with regard to the affective attitude it is possible to distinguish among many individuals two directive tendencies, more or less evident throughout the course of life. Some individuals look for satisfaction in contact with others, the emphasis of their affective experiences and reactions being always on the personal environment. Not only do they react emotionally to the experiences of life, entailing coördination or disagreement with others, but they are always fundamentally in affective contact with the personal and social environment. There are other individuals, on the other hand, who find satisfaction in difference, in detachment and isolation from the personal and social environment. The emphasis of their emotional experiences is much less on the other personalities with whom they come in contact during the course of life, and more on the reactions and ramifications of their own mental experiences, both intellectual and imaginative. One may speak of the first group as the syntropic, because the tendency of the affective attitude of individuals included there is to association and contact with the personal and social environment; the second group, with affective attitude characterized by a satisfaction in difference and separation from emotional relationship with other individuals of their environment, one may speak of as idiotropic.[36]

[35] The word *syn-tonic* conveys the meaning of a *being tuned together*, a harmony between the individual and his environment which is not the distinctive mark of these individuals who have rather a tendency in their affective life to react together with others, *harmoniously or otherwise.* (See later discussion.)

[36] From the Greek word *tropos* meaning turn, turn of mind, affective tendency, and from the Greek *syn-* meaning together with, in company with, and *idios* meaning singular, distinct, separate.

These characteristics are not sufficient to constitute personality types, but are sufficiently distinct to denote antagonistic directive tendencies. The assigning of an individual to the idiotropic or syntropic group must be dependent upon the evidence of more or less habitual reactions in the course of life. Only very rarely do individuals change from one of these extremes to the other. It is not to be understood that syntropic individuals are always well-adapted and in accordance and harmony with the social environment. On the contrary, they are often not well-adapted; but whatever psychological reaction may lead them to social estrangement the fundamental affective tendency to influence the environment, to "get something across," to find satisfaction and consolation in an emotional setting involving other individuals, is often apparent. In the treatment of syntropic individuals with depression one often finds the tendency to suffer not alone, but through and with others.[37] Idiotropic individuals, on the other hand, need not be badly adapted, but may show good social adaptation. This is, however, fundamentally due to lack of emotional contact, rather than by virtue of it. There are certain minor traits in general behavior which are sometimes quite characteristic. Syntropic individuals tend to be "free and easy" in social intercourse, even in actual bodily contacts, for instance walking arm-in-arm with companions; whereas idiotropic individuals are often conscious and self-conscious of the most meaningless and inadvertent physical contacts. While it is not intended to discuss in more detail these differences in affective attitude,[38] an example from the pathological sphere may be given. Delusions of persecution have been distinguished, according to whether the persecution was deserved or undeserved, into delusions which are condemning (belastend) and delusions which are condoning (entlastend). There is, however, this further distinction between delusions of persecution in many cases: idiotropic individuals are often persecuted by individuals or groups which themselves, *according to the patient's point of view and evaluation*, are not socially integrated and conforming, are "different" or outlaws, or entirely individualistic and without any connection with the social

[37] Cf. also cases of double suicide.

[38] The theoretical and clinical bearing of this train of thought will be discussed in a later study.

scheme: for example, "the Catholics," "the Jews," "the Masons," "the political enemy," "the devil," "the underworld," or, quite indifferently, "men" or "women." Syntropic individuals, on the other hand, often elaborate delusions of persecution where the persecutors are, in the eyes of the patient, the very essence and symbol of social contact and cohesion; for example, "all the inhabitants of the home town," "the police," "all decent women," "the whole family," "all my friends," "the government," "every moral person." Practically the kernel of the group of individuals described by Jung as introvert and extravert, by Kretschmer as schizoid and cycloid, and by Hoch as shut-in personality, is closely related to these idiotropic and syntropic tendencies.

The formulations of the pre-psychotic personalities were made at the same time as the psychiatric diagnoses. It is often difficult to arrive at a conclusion about the pre-psychotic personality of mental patients. Frequently the information given by relatives, for example, is not reliable. It can be observed sometimes that relatives and friends have a distinct tendency, in cases of severe psychoses, to describe the personality as what *in their own evaluation* is as good and "normal" as possible. In mild disorders, on the other hand, they often have the tendency to make it appear to the physician as if the patient had been always somewhat abnormal, and as if there was not much change in him which necessitated his admission to the hospital. This occurrence is not unimportant in a clinical study of the pre-morbid personality, and may be spoken of as the phenomenon of distorted personality anamnesis.

The following is an example of a summary of idiotropic tendencies (quoted from 90):

> Schizophrenia of predominantly hebephrenic type, with characteristic hyposthenic bodily constitution; school-girl, aged sixteen. Pre-psychotic personality: wilful child; showed little affection toward family, with abrupt changes from one to another; did not want to be touched or kissed; contrary, reserved, had few contacts with boys or girls; daydreamer. Had crushes on girls and on an older man with whom she had never spoken. Feeling of inferiority; learned well, but did not retain well. Aspired to be either "athletic" or "intellectual;" not as clever as sisters. On basis of inferiority feeling, was selfish, bluffing, gave the appearance of conceit.

Only 31 patients could be assigned to the idiotropic or syntropic groups, either because there was not enough reliable information or because a predominance of idiotropic or syntropic tendencies did not clearly exist.

The correlations between index values and syntropic and idiotropic tendencies can be seen on figure 19.

The average index of the syntropic group is:

217.2 (153–291)

The average index of the idiotropic group is:

289.4 (242–337)

The following are the percentages of body types derived from observation in the syntropic and idiotropic groups:

	per cent	
Syntropic:		
Pyknic	53.4	
Pyknoid	33.3	
Asthenic	6.65	13.3
Athletic	6.65	
Idiotropic:		
Pyknic	0	
Pyknoid	18.7	
Asthenic	18.7	
Athletic	18.7	74.9
Asthenic-athletic mixed	37.5	
Unclear	6.3	

It will be seen that in the syntropic group pyknic forms predominate over the asthenic and athletic types. There are no dysplastic traits occurring in this group. The opposite is true of the idiotropic cases.

The correlations between body-type and personality tendencies seem to be somewhat more pronounced than those with psychoses. This may be due to some extent to the possibility that by this selection of distinct pre-psychotic personality patterns the more constitutional psychotic reactions were selected. On the other hand it must be realized that from the description of the personality alone, from which the personality diagnoses were made, it can not be said whether or not any of the individuals would later develop a psychosis. That these personality differences exist, and that they may have biological cor-

relations with bodily habitus is very likely. One is reminded of the physical habitus of certain characters in history and fiction, like Mr. Pickwick, the benevolent, genial founder of the Pickwick Club in Dickens' novel (fig. 20), in contrast to the erratic, always isolated Don Quixote, in Cervantes' novel, whose slender body-type is traditional in all pictorial representations.

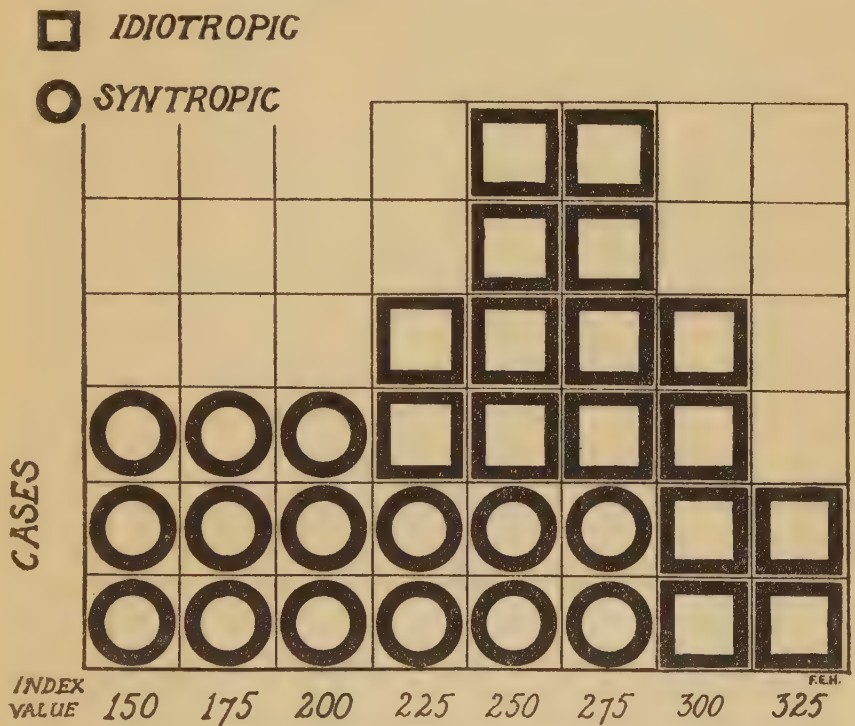

Fig. 19. Relationship between Index Values and Personality Tendencies

CONCLUSION; ASPECTS OF THE HUMAN CONSTITUTION

It seems justified to assume that there is a certain correlation between morphological constitution, mental disease and personality. The broader forms of habitus seem to occur more frequently in affective psychoses and syntropic personalities, the more slender body forms in schizophrenic psychoses and idiotropic personalities. Dysplastic traits seem to have an affinity for schizophrenic reactions. A

FIG. 20. MR. PICKWICK

From the drawing "A Coaching Dream of Dickens" by Houghton, illustrating the pyknic habitus in a syntropic personality. (Compare description of pyknic habitus, page 22.)

numerical formula for this relationship can not yet be attempted with any degree of exactness. It is tempting to venture upon the genetic interpretation of these types. The dysplastic traits described are undoubtedly similar to certain endocrinological disorders, particularly of the gonads and the pituitary. The morphological and mental changes in cretinistic degeneration and myxoedema, which in the latter through thyroid medication are said to have led to perhaps the most sensational therapeutic successes in the whole field of medicine, are an often-quoted example of endocrine etiology. Only the experiment can show how far this analogy can be carried through. In the psychopathological sphere, the polymorphous picture of the psychopathological conditions due to and influenced by hyperthyroidism and dysthyroidism[39] shows the danger of generalizations. The metabolic disorders and the disturbances of the vegetative nervous system described in affective and in schizophrenic psychoses may well be more directly related to the morphological constitution as a whole than to the psychopathological reaction itself.

The problem of morphological changes in endocrine disorders has not been approached with sufficiently accurate anthropometric methods. Instead, impressionistic morphological traits were translated into a highly speculative endocrinological language. The same holds true of the endocrinological interpretation of psychological types; L. Berman's recent book "The glands regulating personality" is an example. Even in the relatively simple sphere of eunuchoid personalities, no unitary decision has been reached. Fränkel (22) finds in the eunuchoid character the most multiform qualities. Scherk (78) finds among eunuchoids a "unitary mental structure" which can be clearly defined and delimited as a whole, and shows variations only as to degree—in other words, a psychological "type." Kretschmer (46) sees close analogies between eunuchoids and schizoid psychopathic personalities. It is evidently for such reasons that Lipschütz (51) says: "The deeper one enters into the problem of connections between inner secretions and personality, the clearer it becomes that every

[39] See Wertheimer and Lyman (92). The hallucinatory psychosis with fear and confusion (case 7) was operated upon and finally took a chronic more or less typical schizophrenic course.

progress in this special question is dependent on a more thorough study of the typological problem itself" (p. 253).

A fundamental connection between body architecture and mental disease, or disposition to mental disease, is inconceivable unless one would believe in a fate-like transmission of both. A genetic explanation would have to take into account constitutional signs in the physiological sphere. The possible variations of simple physiological activities in different individuals have received very little scientific attention. According to Wuth (93) the carbohydrate tolerance, endogenic purin and creatinin excretion, and nitrogen minimum show a remarkable individual constancy and may well have correlations with other constitutional signs. From the facts that have been definitely established it seems, however, more than likely that the individual variations of even the most simple physiological reactions like the knee-jerk or the respiration volume, are far greater than the variation of certain morphological signs. Rautmann (71) has obtained from soldiers and students data which show this for a number of morphological and physiological signs. The smaller the range of individual variations for one sign, the greater significance may be attached to it, if it shows in an individual or a group of individuals values outside the usual small range of variations. Apart from their great variability, however, the correlations of physiological reactions among themselves are as yet very uncertain, even in the field of the vegetative nervous system, which seemed to offer most hopes for the establishment of physiological types. From the physiology of respiration Rutz (1911) (quoted by Gruhle (27)) has distinguished four respiration types, with supposedly characteristic mental make-up:

1. The abdominal type
2. The ascending type
3. The descending type
4. The thoracic type

but although his observations are doubtless interesting, these types are somewhat speculative and construed.

The concept of the unity of the organism has been used in recent times by biologists and psychiatrists. Yet in the field of investigation of the human constitution the limitation of methods makes desirable

the distinction of the morphological, physiological or psychological aspect of constitution. No attempt to explain the human organism as a whole can be complete which leaves out any one of them. Attempts have been made very frequently to make short-cuts and to express psychological reactions in terms of morphology or phsyiology. Graves (26), one of the last scientists imbued with the spirit of Gall, has taken refuge with the shoulder-blade for the estimation of human adaptability, because he wrongly believes that "we cannot subject the mental side of man to direct observation." The uselessness and danger of translating psychological facts immediately into a physiological language "which at present is entirely arbitrary" (36) has been often pointed out, especially by Janet and Adolf Meyer. The modern psychoanalytic mechanism of compensation has been directly related by Lewis (49) to "somatic compensatory changes of growth" in paranoid schizophrenic patients. The constitutional types of Kretschmer have already led with some authors to a terminology in which morphological and psychiatric expressions are mixed. Liepmann (50) contrasts the "pyknic" type with the "schizoid" type (p. 168). In a similar way Naccarati (63) on page 256 states that Kretschmer's "pyknic types" correspond to the macrosplanchnic, the "schizoid types" to the microsplanchnic; or, in another place (62), "Too much mental repression and the quick muscular exhaustion make the hyperthyroid a prospective candidate for the asthenic forms of psychoneurosis." This latter passage illustrates well the mixture of psychodynamic, physiological, endocrinological and psychiatric-clinical language. Pende (65) has elaborated a speculative simplified scheme in which he reduces "morpho-physiological" and psychological facts to two biotypes (p. 48).

Although we must assume that structure and function have a definite relationship also in the sphere of psychobiological integration, both the extent and the nature of this relationship are as yet unknown and a field for investigation. To use morphological constitutional signs for psychiatric diagnosis or prognosis is premature, although the incidence of dysplastic features may perhaps be used with some caution in differential diagnosis. Nevertheless, the possibility of morphological and psychopathological correlations opens a field for

investigation with a bearing upon many lines, and seems to have a significance which no thoughtful clinician can overlook.

SUMMARY

1. From a historical study of the subject of characteristic body types it becomes clear that:

a. Attempts to describe body types have been made frequently; the early studies were mixtures of morphological, physiological and psychological features.

b. Medical studies of the subject were undertaken primarily with the view of correlating body types with disposition to disease as in de Giovanni's investigations.

c. In psychiatry anthropological studies were influenced largely by the doctrine of degeneracy (Morel, Lombroso).

d. A comparison of attempts to formulate morphological types shows a remarkable uniformity of the characteristic body forms aimed at by different investigators. These various classifications have not all been collected and compared before, some authors having been overlooked in the literature on the subject, and almost forgotten (Carus, de Giovanni, Mills, etc.).

2. For the purpose of investigations like the present one, the human constitution is defined as the correlative unity of those morphological, physiological and psychobiological developments of the individual which are definitely more influenced by heredity than by environment.

3. From a critical review of the methods to be applied it becomes apparent that methods of observation and exact measurements have to be used; the problems of clinical anthropology are different from those of racial anthropology, and therefore the methods have to be adapted accordingly.

4. The descriptions of types given by Kretschmer are the most useful. Very similar types have been described before by other authors (de Giovanni, Manouvrier, etc.). Drawings of two young individuals of the same age are given here as illustrations of the main differences between the pyknic and asthenic types. (Plates I-V).

5. The methods of observation are clarified and simplified by the introduction of schematic diagrams, showing typical forms of trunk profile, head outline, hands, forehead, lips and chin. (Figs. 3–7).

6. From an inductive study using exact anthropometric measurements alone no morphological types were found.

7. A critical review of so-called constitutional indices shows that none of them can be put to clinical use; for example, the Pignet Index used by Henckel contains weight, which is variable in mental disease.

8. A new index using skeletal points alone is described:

$$\text{Index} = \frac{\text{Leg length} \times 10^3}{(\text{Transverse chest } D^*) \times (\text{sagittal chest } D) \times (\text{trunk height})} \times 100$$

* D represents diameter.

This index is based on de Giovanni's conception that the impression of the existence of morphological types is based on the relation of trunk volume to limb length. In the 65 patients of this study the observation types agree remarkably with the index values, showing that the extreme low index values correspond to the pyknic type and the extreme high values to the asthenic type, with the less characteristic types between. In this way it is shown for the first time with exact anthropometric methods that there are no types in the strict sense, but only transitions which probably fit into a normal frequency curve, the extreme forms impressing one as types.

9. The clear asthenic, athletic and pyknic observation types of Kretschmer can be exactly differentiated by the use of the index; the athletic type stands between the asthenic and pyknic types, according to the index, but definitely nearer the asthenic.

10. The practical advantage of the index is that it can easily be put to clinical use.

11. The influence of race and occupation on these typical body forms seems negligible.

12. Among the patients with high index values the schizophrenic psychoses predominate over the manic-depressive psychoses; among the patients with low index values (pyknic and pyknoid) the manic-depressive psychoses predominate. The exact numerical relationship cannot yet be established on account of the influence of age and growth.

13. Cases in the affective group specified as showing schizophrenic reactions show morphological characteristics which are more frequent in the schizophrenic group.

14. Dysplastic features (anomalies in the distribution of hair and fat, marked disproportions of the body) predominate very definitely in the schizophrenic group, so that with some caution they may be used in differential diagnosis.

15. The age displacement of types is an important source of error (less significant for dysplastic features); with the percentages of body types in psychoses given by Kretschmer and other investigators using his methods, one is forced to consider that the average age of unselected manic-depressive patients is greater than that of schizophrenic patients. Kretschmer quotes Rohden: in 937 manic-depressive cases 66 per cent are pyknic; in our group of patients the percentage is only 45.5 per cent. If, however, the cases under thirty years of age are left out, the percentage is 66.6 per cent.

16. Two groups of prepsychotic personalities are contrasted with regard to the affective attitude toward the personal and social environment; those who seek satisfaction in emotional contact with others (syntropic) and those who find satisfaction in being detached and isolated, with the emphasis of their emotional experiences not on other personalities but more on the reactions and ramifications of their own mental experiences both intellectual and imaginative (idiotropic). These characteristics do not constitute personality types, but denote antagonistic directive tendencies with regard to affective attitude.

Average index of syntropic group	217.2
Average index of idiotropic group	289.4

The pyknic habitus predominates in the syntropic group, the asthenic-athletic types in the idiotropic group.

17. The endocrinological interpretations of morphological and psychological types are speculative (Pende, Berman, Naccarati, etc.); a genetic explanation of the relationship between morphology and psychopathology will, however, have to take into account constitutional signs in the physiological sphere. The limitation of methods makes desirable the distinction of the morphological, physiological and psychological aspects of the human constitution.

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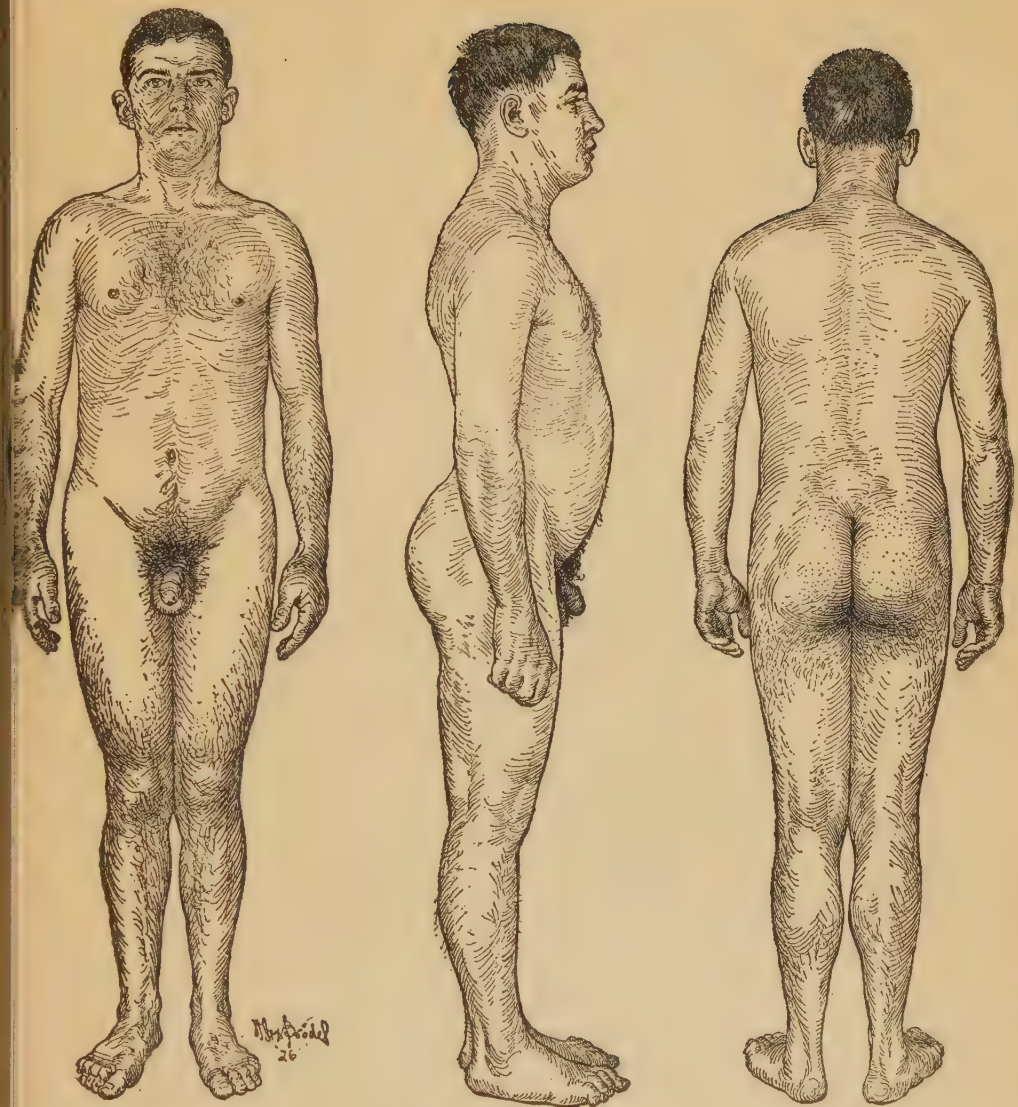
PLATES

PLATE 1

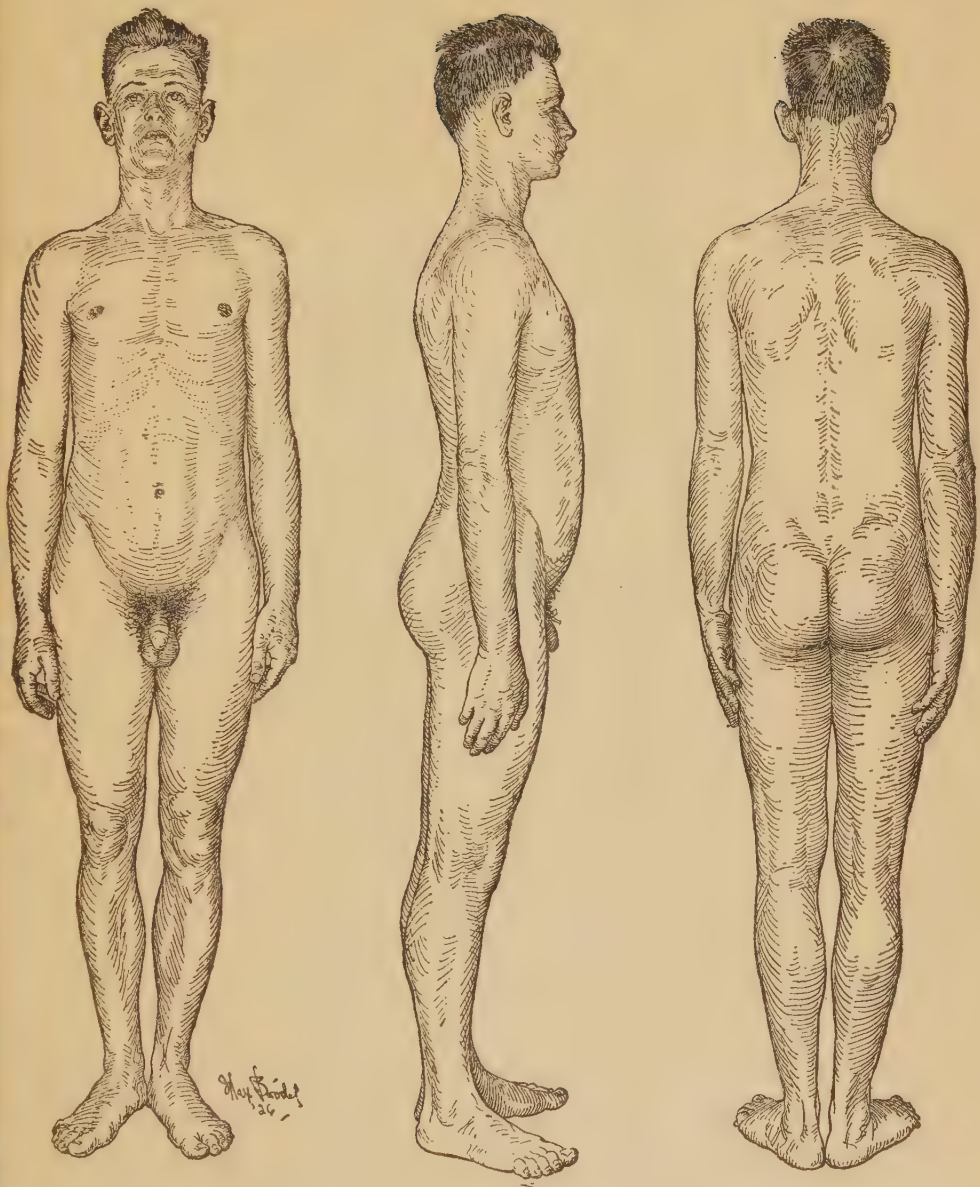
MANIC-DEPRESSIVE PSYCHOSIS, DEPRESSIVE PHASE. SYNTROPIC PERSONALITY. AGE TWENTY-THREE. PYKNIC HABITUS. INDEX: 246



(Wertheimer and Hesketh: Physical constitution in mental disease)

PLATE 2

HYPOCHONDRIASIS IN SCHIZOID (IDIOTROPIC) PERSONALITY. AGE TWENTY-THREE. ASTHENIC HABITUS. INDEX: 305



(Wertheimer and Hesketh: Physical constitution in mental disease)

PLATE 3

CONTRAST BETWEEN PYKNIC AND ASTHENIC TYPES
(Front view)

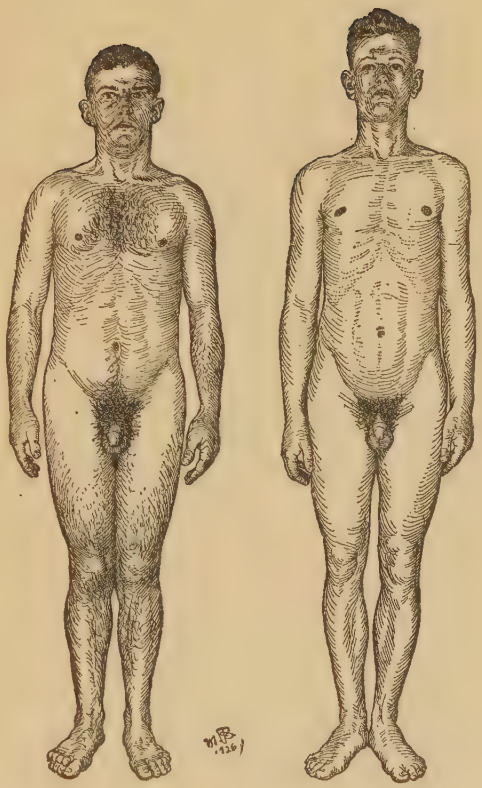


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PLATE 4

CONTRAST BETWEEN PYKNIC AND ASTHENIC TYPES

(Back view)

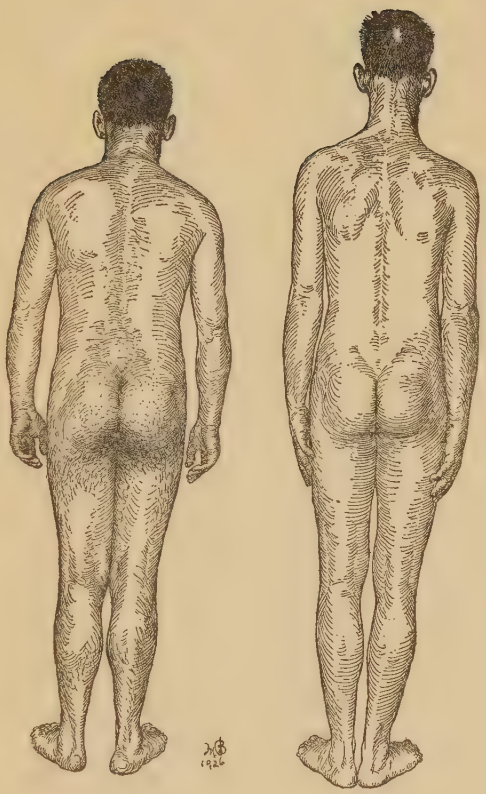

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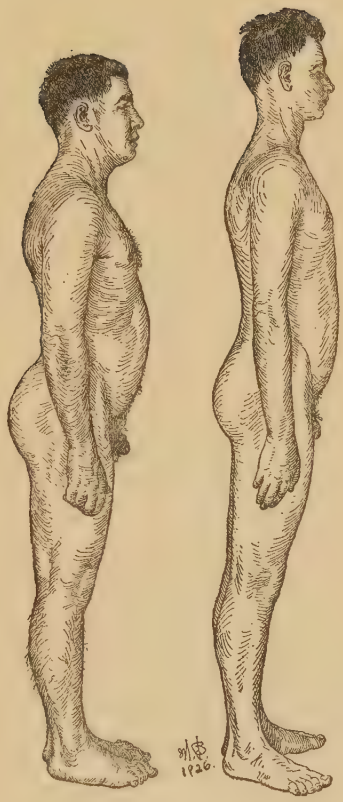
PLATE 5

CONTRAST BETWEEN PYKNIC AND ASTHENIC TYPES

(Side view)



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